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Proceedings



OUTLOOK '90

66th Agricultural Outlook Conference
U.S. Department of Agriculture
Washington, D.C.
November 28 - November 30, 1989

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture

Washington, D.C. 20250-3900



PREFACE

These pages contain the proceedings of the U.S. Department of Agriculture's 66th annual Agricultural Outlook Conference. Included are all papers submitted by those participating in the program and transcriptions of several speeches and panel discussions.

Outlook '90 took place at USDA headquarters in Washington, D.C. November 28-30, 1989, with about 1,200 people in attendance. Nearly 80 speakers and panelists representing U.S. and foreign governments, agribusiness and agricultural organizations participated in 24 sessions.

In addition to the traditional coverage of the outlook for the farm economy and major commodities, rural America and food and nutrition, distinguished speakers discussed the 1990 Farm Bill and other pending farm legislation, evolving multilateral trade negotiations, food safety and environmental policies and global climatic and economic change.

A separate publication presenting charts used by speakers at the conference, Outlook '90 Charts, is available. Audio cassette tapes of all conference sessions are also available. Information about the tapes, chartbook and other publications of interest can be found at the back of this book.

Recipients of this proceedings will be sent preliminary information on next year's conference, Outlook '91, which has been tentatively scheduled for November 27-29, 1990.

For further information contact Raymond Bridge at (202) 447-5447.

James R. Donald

JAMES R. DONALD

Chairperson

Outlook Conference Steering Committee

World Agricultural Outlook Board
Room 5143 South Building, USDA
Washington, D.C. 20250-3800

April 1990

CONTENTS

<u>Session</u>	<u>Topic and Speaker</u>	<u>Page</u>
1	Keynote Address, Clayton Yeutter..... The Economy and Agriculture in the 1990's, Michael J. Boskin.....	1 6
2	TRADE AND AGRICULTURAL POLICIES FOR THE 1990'S The Status of Trade Negotiations, Carla A. Hills..... Trade Policies for the 1990's: Questions, Ambassador Hills and Secretary Yeutter..... Panel: Agricultural Policies for the 1990's, Clayton Yeutter, Hon. Edward R. Madigan, and Hon. Tim Johnson.....	11 14 20
3	OVERVIEW OF 1990 PROSPECTS U.S. and World Economic Outlook, Roger E. Brinner..... World and U.S. Agricultural Outlook, James R. Donald..... Agricultural Trade Outlook and Issues, Ann Veneman.....	36 43 57
4	OUTLOOK FOR FOOD GRAINS Food Grain Outlook, Frank Gomme..... Industry Perspective, Reggie Wyckoff, no text submitted Rice Outlook, Tor Jernudd, no text submitted	63
5	OUTLOOK FOR FEED GRAINS The Feed Grain Outlook for 1989/90, Lawrence Van Meir..... The Outlook for Feed Grains and Policy Implications, William Lapp..... Grain Quality and International Trade, Lowell D. Hill.....	75 80 89
6	RURAL DEVELOPMENT INITIATIVES Federal Policy Initiatives, Roland Vautour..... State Roles and Responsibility, George Mickelson..... New Rural Development Legislative Proposals, David Freshwater..... Public and Private Partnership, Terry Donahue.....	94 98 104 114
7	IMPACT OF FUTURE TRANSPORTATION POLICY ON AGRICULTURE AND RURAL AMERICA Future Transportation Policy as it Impacts on Agriculture and Rural America, Wallace Burnett, no text submitted Private Sector Perspective on Transportation Needs of Agriculture and Rural America, Pete Carpenter, no text submitted	

<u>Session</u>	<u>Topic and Speaker</u>	<u>Page</u>
8	OUTLOOK FOR FOREST PRODUCTS	
	Outlook for Timber Products, Robert Phelps.....	119
	Timber Demands and Supplies to the Year 2000 and Beyond, David R. Darr.....	130
	Outlook for International Trade in Solid Wood Products, Stephen M. Lovett...	137
9	OUTLOOK FOR TOBACCO	
	Outlook for Tobacco, Verner N. Grise.....	144
	Policy Issues Facing the Tobacco Industry, Daniel A. Sumner.....	151
10	OUTLOOK FOR AQUACULTURE	
	Outlook for U.S. Aquaculture, Michael R. Dicks and David J. Harvey.....	163
	Mandatory Seafood Inspection, Lee J. Weddig.....	173
	U.S. Aquaculture Research Needs, Dr. James H. Tidwell.....	183
11	ALTERNATIVES IN AGRICULTURE	
	Alternative Crops and Products, R. Dean Plowman.....	195
	Sustainable Agriculture, John E. Ikerd.....	201
	Management Decisions for Alternative Agriculture, L. Joe Moffitt.....	214
12	OUTLOOK FOR FOOD PRICES AND NUTRITION	
	The 1990 Outlook for Food Prices, Ralph L. Parlett, Jr.....	220
	Second Report on Nutrition Monitoring, Susan M. Pilch.....	227
	USDA's Nutrient Data Base for Nationwide Dietary Intake Surveys, Betty P. Perloff.....	241
	Outlook for Food Prices, Robert L. Rizek, no text submitted	
13	OUTLOOK FOR OILSEEDS	
	Outlook for Oilseeds, James D. Schaub.....	249
	Soybean Complex-Features To Watch in 1990, Mickey J. Luth.....	255
	Government Programs and Soybean Acreage: Time for New Thinking, Dr. Kenneth Bader.....	269
14	OUTLOOK FOR LIVESTOCK AND POULTRY	
	Outlook for Cattle and Sheep, Steve Reed.....	279
	Outlook for Hogs, Kevin Bost.....	287
	Outlook for Poultry and Eggs, Lee A. Christensen.....	293
	Meat Industry in the 1990's, Scott Wallace, no text submitted	
15	OUTLOOK FOR FRUIT AND VEGETABLES	
	Outlook for Vegetables, Shannon Reid Hamm.....	302
	1990 Outlook for Fruit and Tree Nuts, Katharine C. Buckley.....	313
	The Food Safety Controversy: Implications for the Fresh Produce Industry, Dr. Roberta Cook.....	326

<u>Session</u>	<u>Topic and Speaker</u>	<u>Page</u>
16	OUTLOOK FOR COTTON	
	Outlook for Cotton, Robert A. Skinner.....	333
	Cotton Legislative Update, John Maguire.....	348
	Cotton Outlook for 1989/90 and 1990/91, Dewell R. Gandy.....	353
17	FAMILY ECONOMICS	
	Urban and Rural Households: Economic Status Over Time and Current Status by Selected Characteristics, Mark Lino.....	360
	Children in Nonmetro America: Economic Well-being in a Family Context, Carolyn C. Rogers.....	370
	The Housing Plight of Older Farm Workers, Joseph N. Belden, no text submitted	
18	BIOTECHNOLOGY	
	Status of Agricultural Biotechnology, Alvin L. Young.....	385
	Industry Perspective, Richard D. Godown, no text submitted	
	Intellectual Property Rights for Biotechnology, Jeffrey L. Ihnen.....	394
19	NEW ACTION ON WATER QUALITY	
	An Overview of the USDA's Water Quality Initiative, Peter F. Smith.....	409
	Water Quality Legislation: Implications for Agriculture, Katherine Reichelderfer.....	417
	Water Quality, James B. Boillot.....	423
20	OUTLOOK FOR SUGAR AND SWEETENERS	
	World and U.S. Outlook for Sugar and Sweeteners, Peter J. Buzzanell.....	428
	World Sugar Outlook: Another View, Christopher Pack.....	452
	The Changing Structure of the U.S. Sweetener Industry, William C. Shanley III.....	459
	The Sugar Policy Horizon, Carol Brick-Turin.....	473
21	FARM SECTOR ECONOMIC PROSPECTS	
	Finance Outlook: Steady-State Farm Economy, Gregory Hanson, Diane Bertelsen, Kenneth Erickson and James Ryan.....	481
	Outlook for Farm Outputs, Stan G. Daberkow.....	493
	Panel: Issues in Financing Agriculture in the 1990's, Glenn J. Hertzler, Jr., John C. Dean, Rusty L. Jesser and Jere T. Thorne, no texts submitted	
22	OUTLOOK FOR DAIRY PRODUCTS	
	Outlook for Dairy, James J. Miller.....	504
	1990 Midwest Outlook, Look at the Past To See the Future, Michael J. McDonald.....	508
	Bovine Somatotropin: Current Status and Issues, Richard H. Teske, no text submitted	

23 GLOBAL CHANGE: IMPLICATIONS FOR AGRICULTURE

Implications of Global Change for Agriculture, Norman J. Rosenberg.....	520
Disaster Protection in an Era of Weather Extremes, Jonathan I. Kislak.....	535
Economic Implications of a Changing World for U.S. Agriculture in the 1990's, Bruce Gardner.....	538
Economic Implications of a Changing World for Agriculture, an Australian Perspective, Brian Fisher, Paul Riethmuller, Graham Tie and Bruce Bowen....	548

24 ENVIRONMENTAL CONCERNS, FOOD SAFETY AND AGRICULTURE IN THE 1990'S

Finding Viable Solutions to Agriculture's Food Safety and Environmental Challenges, Jack C. Parnell.....	563
Critical Environmental Issues for Food Safety and Quality, Frank E. Young...	568
Critical Environmental Issues for Agriculture, F. Henry Habicht II.....	577
Environmental Concerns, Food Safety and Agriculture in the 1990's: Questions, Jo Ann Smith, Frank E. Young and F. Henry Habicht II.....	582
OTHER PUBLICATIONS OF INTEREST.....	585

Schedule at a Glance

Tuesday, November 28

Jefferson Auditorium

- 12:30 1 Keynote and Long-Term Economic Setting
 2 Trade and Agricultural Policies for the 1990's
 1:30 Part 1: International Trade Policy
 2:00 Break
 2:15 Part 2: Panel on Agricultural Policy
 3:30 Break
 3:45 3 Overview of 1990 Prospects
 5:15 Conference Reception, Administration Building Patio

Wednesday, November 29

	Jefferson Auditorium	Room 107 Administration Building	Room 3501 South Building	Room 1605 South Building	Cafeteria Meeting Room
8:30	4 Food Grains	6 Rural Development (ends 10:30)	8 Forest Products	10 Aquaculture	12 Food Prices and Nutrition (ends 10:30)
10:00	Break				
10:30	5 Feed Grains	7 Transportation (11:00-12:00)	9 Tobacco	11 Alternatives in Agriculture	
12:00	Lunch				
1:30	13 Oilseeds	15 Fruit and Vegetables	17 Family Economics	18 Biotechnology	
3:00	Break				
3:15	14 Livestock and Poultry	16 Cotton		19 Water Quality	20 Sweeteners
5:00	Adjourn				
Wednesday Evening	Cotton and Sweeteners Dinners, Administration Building				

Thursday, November 30

	Jefferson Auditorium	Room 107 Administration Building	Cafeteria Meeting Room
8:15	23 Global Change: Implications for Agriculture	21 Farm Sector Economics	22 Dairy Products
10:15	Break		
10:30	24 Environmental Concerns, Food Safety and Agriculture in the 1990's		
Noon	Adjourn		

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
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Outlook '90, Session #1

For Release: Tuesday, November 28, 1990

KEYNOTE ADDRESS

Clayton Yeutter
Secretary of Agriculture
U.S. Department of Agriculture

To begin, let me report to you about the U.S. Economic Delegation to Poland which will depart later today. On behalf of President Bush, I will lead a group of about 20 very talented people from the private sector, some of whom are agriculturalists, others from the industrial sector, and the finance sector, and from academia. Other government representatives are Chairman of the Council of Economic Advisers Michael Boskin, Secretary of Commerce Robert Mosbacher and Secretary of Labor Elizabeth Dole and officials from USDA and the Treasury and State Departments as well.

We will take a very close look at the entire Polish economy over the next two and a half days. Much of the focus on Poland until now in all areas has simply been on aid and assistance programs of one kind or another. Although very important, that kind of help is transitory. We do not want to see Poland become dependent upon the United States, Western Europe, Japan or anybody else for aid as a long-term proposition. The healthy way to have this economic upheaval evolve in Poland is to convert it from an aid or assistance kind of environment as quickly as possible into a political and economic environment in which the government and the economic system can safely stand. We will try to examine the situation to see what we can do to help them do over the next 3 to 5 years. It will be interesting to see whether we learn some things in Poland that might have applicability in some of the other Eastern European countries as they move away from Communist domination as well. We may have a better answer when we return.

These are fascinating times indeed. For if all goes well in Poland and in other countries of Eastern Europe, over time they will be better customers for American farmers and for others as well.

Now let's look at the broader international scene. As most of you know, the United States surfaced its final proposal in agriculture for the Uruguay Round in Geneva a month or so ago. This will now be the precursor to intense negotiations next year. Others have yet to surface their final positions in agriculture. The Cairns Group -- about 13 agricultural exporting nations, including Canada, Australia, New Zealand and Argentina -- surfaced its paper just yesterday; it is very consistent with ours. Japan surfaced a final position paper yesterday as well. Some of that is compatible with ours, but

most of it is not, which is not too surprising. The European Community has not yet finished its final paper. It is unlikely that it will be compatible with ours. We always hold out hope that reason ultimately will prevail in Brussels, but that may have to await the negotiating process.

In my judgement, we have postured those negotiations properly with emphasis on activity and disciplines and reforms in the area of export subsidies, market access or import restrictions, internal support programs, and finally, sanitary regulations. There are four blocks for agricultural trade reform, as we see it, and in my judgement they are all tremendously important. We will obviously see some second guessing of all of these position papers. This is going to happen in every country and that is probably inevitable as the concluding year of negotiations unfolds. People begin to postulate worst-case scenarios. I hope you who represent agricultural groups and organizations here and abroad will not do that. We ought to be able to do better than that in the Uruguay Round, not only for the United States but for many of the other participants as well.

Just to give a couple of examples, I continually hear people saying, "The United States wants to get rid of all farm subsidies, all farm income supports." That is just totally unrealistic, and a misrepresentation. It has never been the U.S. position. We can have differences of opinion as to how the negotiations should ultimately emerge, but deliberate misrepresentation certainly does not help the negotiating process and does not help bring about a sound and sensible result. We have no objections to a continuation of income supports in any country. We expect that to occur in many countries, including the United States, for a good many years to come. The question is how those supports are designed. And all we have been saying for 3 solid years now is that all nations, including the United States, ought to be able to design their programs of financial support to farmers in ways that minimize distortions to trade. That is an objective on which everybody in the world ought to be able to agree. If we can agree on that as a legitimate objective in agricultural trade policy, then we can make significant progress in these negotiations.

I also keep seeing some reports that farm incomes in the United States are likely to decline if full trade liberalization is negotiated in the GATT. Such reports pick out only the elements of some of the studies, including USDA's, that can be used to support their particular arguments. There is no doubt that if one were to wipe out all price and income supports tomorrow in the United States and other countries, incomes would go down at least in the short run because trade volumes would not increase enough overnight to generate income out of the marketplace to offset the loss of income that had come from government. But nobody is suggesting that income supports go down to zero. So if that's the assumptions of the reports, those of us who read those studies and cite from them ought to be circumspect enough and intellectually honest enough to recognize that suggesting a reduction in income is really an irresponsible distortion of what they say. The fact is, all those studies indicate that world market prices for most products would rise with trade liberalization. And as a consequence, incomes emerging from

the marketplace in many countries, particularly the United States, would rise. Then, to what degree governmental support is adjusted is a question to be decided by each country. The increase in economic welfare that would result from trade liberalization and trade reform, however, is such that millions of farmers would be better off than they are today.

This is a subject that ought to stimulate the interest of each of you over the next 12 months. Certainly we need the support, the involvement and the counsel of the entire agriculture community as we try to obtain a result that is good for the United States, good for American agriculture, and good for the world. I think it is all achievable.

Now let's discuss farm legislation for 1990. We have not finalized our own views within the Department of Agriculture. We will, probably after the first of the year when Congress returns because that is when the debate will commence. I believe it is incumbent upon the President and the Secretary of Agriculture to speak up on these subjects, and we intend to do so. We intend to work with the Congress in a cooperative vein. That will be our objective, our tone and our intent. I hope we will see Congress respond in a comparable manner.

There have been some comments that we want to write the 1990 Farm Bill in Geneva, Switzerland, in the GATT negotiations I just mentioned, rather than in Washington, D.C. That is nonsense because the 1990 Farm Bill is very likely to be written before the negotiations are finalized in Geneva. Therefore, if changes in farm legislation are called for by the negotiating process, they will have to occur in 1991, not 1990.

What should we do then in 1990? Should we simply extend present legislation or hone and polish it some as we go into the 1990's? I believe we ought to attempt to hone and polish. This is a fast-changing world and all of us know that there are some shortcomings to the existing farm legislation. My judgement is that there is a substantial level of satisfaction with the 1985 Farm Bill, but nothing is perfect. We ought to be able to make changes in the 1985 Farm Bill that would be meaningful for 1990, some of which could clearly carry on a good number of years irrespective of what happens in Geneva. In fact, it is conceivable that much of that legislation could stand on its own, without in any way violating the spirit of what we are attempting to achieve in Geneva, and would not need to be changed in 1991. So we ought to work diligently to make changes that are appropriate. Certainly the whole question of flexibility will come to the fore. Everybody seems to be in favor of flexibility. Not everybody agrees on what flexibility is or should be, but our present farm bill structure is much more rigid than it should be.

There ought to be some additional emphasis on what we need to do in this country to make sure that we are internationally competitive. In the long run, we have to compete. We have been competing very well in agriculture. I am convinced that we can continue to do so in a vast percentage of American agricultural enterprises for many years to come. That is imperative if we

are going to have agricultural trade reform in the world and open up some market opportunities.

We also need to work on the whole subject of what I call demand-creation or demand-generation. This gets into the philosophical discussion of supply-management approaches to raising prices and incomes for American farmers versus actions on the demand side to raise farm prices and farm incomes. I confess to being a bit surprised that the supply-management approach has any advocates in this country. It obviously has fewer than it did years back when it was first tried.

There is an infinite variety of ways to attempt to raise farm incomes through supply-management approaches. Most have been tried at one time or another over the last 40 years either here or in other countries around the world. Most, if not all of them, have failed at one time or another. The fact is that the cost of supply-management approaches must be borne either by taxpayers or consumers.

I would simply pose a couple of rhetorical questions. Do you really believe it is possible to make a case for additional taxpayer costs to support supply-management approaches in the future? In the face of a \$100-billion-plus Federal budget deficit, which is required by the Gramm-Rudman-Hollings law to drop to \$64 billion in fiscal year 1991, \$32 billion in fiscal year 1992, and zero in fiscal year 1993, what are the probabilities of finding additional Federal tax dollars to support supply-management programs? I would appraise those probabilities as being between slim and none.

Can we convince the consumers of America to provide additional financial support for farmers by paying significantly more for food? We all know that food is an enormous bargain in this country, cheaper than anywhere else in the world, and certainly one can build a case that additional costs to consumers for food prices would not be an intolerable burden. But there are some limits to how far one can go in that regard. We had some consumer rebellions in the 1970's as food prices rose dramatically.

Since there are very definite limits to what can be achieved with supply-management approaches, we must turn our attention to ways in which to generate additional demand for American farm products. I find a lot more satisfaction for the agricultural community, for farmers, for the government, for USDA, and for me, personally, in working on the demand side of agriculture than I do in working on the supply-management side. There is something rewarding about finding additional ways to sell American products and finding additional uses for those products.

We ought to focus domestically on finding new uses for American farm products and new products to produce. That calls for research, of course, and an investment in the future. Twenty years from now we may be growing thousands of acres of crops in this country of individual varieties or strains that are not even on our radar screens at the moment. We ought to produce in this

country what it is that will make us the most money as farmers, not what we most enjoy producing. Internationally, of course, it gets to the Uruguay Round objective of opening up markets so that we can expand our exports.

We have great potential for additional demand generation for American agricultural products if we just work on it. We are working hard at it now. I think we can do a lot more in the future. And I will certainly look forward to exploring those possibilities with you and others in the agricultural sector as time goes on.

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United States Department of Agriculture
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Outlook '90, Session #1

For Release: Tuesday, November 28, 1989

THE ECONOMY AND AGRICULTURE IN THE 1990's*

Michael J. Boskin
Chairman, President's Council of Economic Advisers

It is a particular honor and privilege for me to be here addressing the Department's Outlook Conference. Agriculture has been and remains an important part of the American economy and the world economy. Indeed, agriculture will be one of the major issues we will be discussing in the Uruguay Round of the GATT. But it is also a particular honor for me to appear on the same podium with Clayton Yeutter who has made tremendous contributions to this Administration as well as to previous ones. He is doing a spectacular job as Secretary of Agriculture.

Although I am not a specialist in agricultural economics, I am well aware of the importance of agriculture and agricultural policy in overall economic developments in the U.S. and the world. As Chairman of the Council of Economic Advisers to the President, I have a keen interest in Government policies toward agriculture. While today I am going to leave the task of commenting on the agricultural outlook primarily to others, I am going to discuss the general economic outlook for the United States and the world economy and talk about the general principles of economic policy the Administration supports and how they apply in today's world.

First, the U.S. economic outlook remains strong. The American economy can, should and will, I believe, sustain its economic growth. We are in the 84th month of the second longest expansion in the history of the United States.

Tomorrow morning the Commerce Department will report its revised estimate of the third-quarter GNP growth. Its original estimate of 2.5 percent is probably going to be revised up a bit. While we have been forecasting all year long that the very end of 1989 and the beginning of 1990 will be a little more sluggish, we do expect the economy to pick up in mid-1990 and in 1991 to grow at a more robust pace. We believe that the economy will continue to make substantial progress in simultaneously creating additional jobs and maintaining low unemployment and relatively low and gradually falling inflation. We reject the notion that the only way to keep inflation under control is to run a slack economy for a sustained length of time. We have ambitious goals--but realistic ones--for the American economy.

We are in the midst of preparing our economic forecast, which will appear, amongst other places, in the Economic Report of the President in late January or February and in the Budget of the President in January. It is unlikely there will be major changes from our mid-session economic forecast, because

*Based on a transcript

the economy has performed quite close to what we predicted, growing in the 2 to 2.5 percent real growth range. Inflation, which increased somewhat in the beginning of the year primarily due to a blip in energy prices, appears to have stabilized, and we believe that will continue. And the economy continues to provide enough new jobs to keep unemployment rates at the low levels we have not seen since the early 1970's.

A variety of people disagree with our outlook of sustained growth and relatively low unemployment and controlled and gradually reduced inflation over the next several years. Others believe the economy will grow more robustly. We are in the midst of trying to develop new Administration initiatives and repropose some that Congress did not pass which we believe will help expand productivity, entrepreneurial activity, investment and, thereby enhance economic growth. There are some people, some private forecasters, who believe the economy is going to slow more than the slight slowing we expect for the next few quarters. But even the most pessimistic private forecaster does not see any severe slowing of the economy. The most pessimistic forecasts call for only a few quarters of slightly negative growth, followed by a rebound in the economy later in 1990. We believe those forecasts are quite pessimistic.

There are a variety of reasons we believe the economy is capable of sustaining growth, controlling inflation and providing rising employment. All episodes of severe downturns in our economy in the post-World War II era have been preceded by an acceleration of inflation. Except for a blip up in the early part of 1989 in energy prices and a collapse of energy prices in 1986, we have kept inflation relatively steady in the 4 or 4.5 percent range since the early 1980's. And while we can and need to do better than that over time, we have not seen the kind of inflationary pressure that requires draconian action, which in the past has often led to a decline in economic activity.

There are always risks to the economy, there are always potential problems, and we believe the risks are about symmetric: that we are just as capable of better growth as we are of more sluggish growth than what we are currently predicting. We also believe it is important to understand that many factors govern the performance of the economy. For example, there can be external shocks, positive or negative. An example of a negative external shock to our economy was the Arab oil embargo of the 1970's which transferred wealth from the United States to OPEC, contributing to the 1974-75 recession. Alternatively, the economy can turn down because of a policy mistake. We do not see any policy mistakes on the horizon. We believe a continued monetary policy towards sustaining growth and controlling inflation, further progress in reducing the budget deficit, the avoidance of unnecessary regulation, and further progress toward freer and fairer trade will serve us all well in the years ahead. Of course, you only recognize a policy mistake after the fact. Examples of those that turned out bad were the Smoot-Hawley Tariff that worsened and deepened the Depression, and the tax increase and the Federal Reserve tightening that occurred after the stock market crash of 1929.

There are also a variety of other things that could cause the economy to get out of whack. A typical one is an inventory imbalance. Inventories build up and many sectors of the economy simultaneously choose to reduce their production and orders to get inventories back under control. While we have seen a little inventory buildup in the economy, it has been primarily concentrated in automobiles and it does not appear to have been spread widely throughout the economy. This is another reason we believe the economy will continue to sustain its moderate growth for the next few quarters, then rebound to more solid growth in the latter half of 1990 and 1991.

Because the outlook for the overall economy is good, the outlook for agriculture bodes well also. The gradual decline in inflation we expect implies that interest rates should move down gradually. Our proposed reductions in the Federal budget deficit should help lower interest rates. And lower interest rates will help the agricultural sector continue its recovery from the financial difficulties of the mid-1980's.

There are exciting market opportunities going on all around the world, which I am going to leave to Carla and Clayton to discuss. But we have opportunities to reduce trade distorting barriers, and we have opportunities to open new markets for agriculture.

I want to say a word or two about the economic achievements of the current expansion to place it in some perspective. I have said we are in the 84th month--7 years--of economic expansion. Some people interpret that as meaning because the expansion is long, it must end soon. Nothing could be further from the truth. There is no statistical relationship between the length of an economic expansion and the probability of a downturn. This expansion didn't die when it became the longest post-war peacetime expansion, but it has continued for a year and a half longer. No one can say we will never have another recession. But just because the expansion is long it needn't soon "run out of gas," or "run out of steam," or "have a crash landing." Indeed, with all due respect to my colleague, Sam Skinner, our Transportation Secretary, I am getting a little tired of these transportation analogies for the economy!

I have said that I believe the expansion can, should and will continue and I have given a hint of the kinds of things that might cause it problems--an inadvertent policy mistake, an external shock or some imbalances. We do not have any of those brewing, in my opinion, but I am the first to admit those kinds of problems are easier to see after the fact than beforehand.

Longer term, we believe the economy is capable of growing at around 3 percent after inflation, or a little better. Achievement depends heavily on adopting policies to enhance our productivity growth, to enhance research and the commercialization of that research and to expand investment and improve education and the like.

In the context of this outlook, the Administration has also developed a set of economic principles. They are similar to--not necessarily identical with--those of the Reagan Administration. There are four major areas of

economic policy, let me say a word or two about each. Since there are an infinite number of economic decisions and economic policy issues you may be concerned about, if I say a word or two about our general philosophy and principles in each, you will have a way of figuring out how we are likely to develop policy in each area.

First, we support a monetary policy which sustains economic growth while predictably controlling inflation. That is quite feasible and doable. We also support a gradual reduction in the budget deficit along the guidelines of the Gramm-Rudman-Hollings targets that will help take pressure off interest rates. It will give the Fed a little more elbow room, and it should provide some extra saving for investment by decreasing the Federal Government's drain on our modest private saving pool.

We want to avoid unnecessary regulation, deregulate where desirable and possible, as we have just done with natural gas at the well-head. And where regulation is necessary and desirable, we want to do so in a manner that gives the firms and the workers involved the maximum flexibility to achieve any necessary standards or targets or social goals at the least cost and the least economic disruption. If you look at our clean air proposal and some other proposals, we have tried in some novel new ways to harness the power of the marketplace and reduce the cost of achieving any given set of regulatory goals. I think you will see more of the same when and if we decide that regulation is desirable or necessary in other areas.

Finally, let me say a word about trade policy. We remain committed to helping lead the world to freer and fairer trade. We are working hard in the Uruguay Round of the GATT to bring 15 areas, including agriculture, into the GATT. You will hear more about that later. We take this very seriously. It is highly important to successfully conclude this most ambitious round of the GATT. Maintaining a free and open world trading system is vital to our economic prosperity, the economic prosperity of our trading partners, and the economic prosperity and potential of the developing economies. We have serious trade tensions. We need to work hard to remove them. There are various countries that don't always play fair, and we have been criticized ourselves in that regard. We are going to need to work hard to open markets both here and abroad to both the flows of goods and capital.

Those are our economic principles. We are trying to implement them on a daily basis as we make economic decisions. Let me also tell you that one of the things that has been most educational for me in my first year in Washington is the enhanced appreciation for the difficulty of making various decisions. Many of the decisions we make, whether dealing with macroeconomic policy, the budget, agriculture, or clean air are multi-faceted. Economic costs and benefits are important components, but sometimes other dimensions like the environment or foreign policy can loom large also. It is only the person in the Oval Office who can balance all the important considerations.

Finally, I want to tell you an apocryphal joke about transitions. After President Carter took over from President Ford, he asked Ford for advice on how to be a better President. President Ford handed President Carter three envelopes. The first said open only in case of emergency; the second, only

in the case of a disaster; the third, only in case of a catastrophe. When the inflation rate accelerated from 4 percent to 8, 9 and 10 percent in the late 1970's, that looked like an emergency. President Carter opened the first envelope and it said, "Blame the Federal Reserve."

Things got worse. We had a run on the dollar, inflation accelerated, and it looked like a disaster. So President Carter opened the second envelope and it said, "Blame Me."

Well, things got worse. President Reagan won the next election. And so President Carter opened the envelope. It said, "Prepare Three Envelopes." All I can tell you is that with talented people like our Agriculture Secretary and our U.S. Trade Representative and with all of your help and your hard work, we will all be making sure that President Bush isn't preparing three envelopes in 1992.

Thank you very, very much.

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

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Outlook '90, Session #2

For Release: Tuesday, November 28, 1989

THE STATUS OF TRADE NEGOTIATIONS*

Ambassador Carla A. Hills
U.S. Trade Representative

The Bush Administration's trade strategy is to open markets so as to expand trade. We seek to do this in three ways: first and foremost, through a successful conclusion in December 1990 of the Uruguay Round; second, through our ongoing bilateral initiatives with our trading partners; and third, we do not hesitate to use the leverage of our market -- to create market openings when and where we can, not only for U.S. entrepreneurs, but for the world at large. We believe that in opening markets and expanding trade, we expand not only our prosperity but the prosperity of the world's peoples. And, indeed, that strategy drives all of our trade actions.

When you look at the initiatives that we have commenced toward eliminating subsidies in shipbuilding and in steel, we're seeking to get government out of those businesses. When you look at our agreement with the Canadians for free trade, we now have an energetic effort to accelerate reductions of tariffs. We have made a real commitment to be vigilant toward Europe's march toward a unified market. We are pleased about having Europe eliminate the barriers amongst the twelve states, but we worry lest it erect barriers on the periphery. And concerning the 1988 Trade Act, if you notice in our bilateral actions with respect to Japan, we have tried to open the markets in the area of super computers, to get public procurement open in satellites, and to still be consistent with our efforts in the Uruguay Round. We also are concerned about discriminatory standards in forest products.

In the area of services, we are trying to open up markets which are large and offer a real potential to entrepreneurs all around the world and, particularly, our service providers. The same can be said of investment. The Uruguay Round, which is the eighth round of multilateral negotiations and the most comprehensive in history, ends in December and is a prime concern now. We have 15 negotiating groups seeking to open markets and to expand trade in various sectors. You might ask, "Why do we care so much about this Round?" We do not need an economist's textbook to tell us that the accords that we seek will generate prosperity. We can look back to 1948, the beginning of the General Agreements on Tariff and Trade, the GATT, and see that negotiations among the world's trading nations have reduced barriers and caused an expansion of trade so that we have had four decades of worldwide prosperity unparalleled in world history. We would like to continue trade growth for the next 40 years and 40 years thereafter as well.

The problem today is, we really have outgrown the GATT structure. We have enormous areas of trade which are uncovered by rules or discipline.

*Based on a transcript.

Agriculture is inadequately covered, and the new areas of services, investment and intellectual property are not covered at all. Roughly, about a trillion dollars a year or about a third of worldwide trade is uncovered by any discipline. Hence, we are looking for an ambitious package in the Uruguay Round of multinational trade talks that will provide fundamental reform of trading system and market liberalization. We start with the area of agriculture where we're seeking fundamental reforms. We seek to maximize market access, to provide an end to export subsidies, to achieve real disciplines over administered or internal subsidies, and to negotiate clear health and sanitary rules so that we avoid the disputes, such as over beef and hormones, that have been so contentious with our friends in the European Community.

We also want to obtain a comprehensive agreement concerning intellectual property rights. High technology is the story of tomorrow. High technology is where the United States is premier. We have real export potential in areas such as in aerospace, medical equipment and pharmaceuticals. Those industries can't afford to locate in jurisdictions where their proprietary data is stolen. We want a comprehensive agreement that provides agreed-to rules and standards that will be applied in foreign jurisdictions, at our border, a sound enforcement system, and we want a sound dispute mechanism just in case of government-to-government differences.

We also want rules of fair trade to govern services. Service providers today account for over \$500 billion in trade. They should be able to get the same treatment in other countries as domestic service providers. We also want the rules to be transparent. So whether it's tourism or hotels, construction or financial services, the rule should allow our service providers who are at the top in world competition to participate.

We also want an agreement that eliminates the restrictions on investment, like local content. We want our entrepreneurs to be able to invest in other countries without having trade-distorting restrictions imposed upon them.

We also want a good agreement that guarantees access, for both industrial and agricultural goods.

We need to integrate the less-developed countries into this worldwide system of trade that is disciplined. Right now about \$500 billion of trade is conducted by the less-developed world. But when we ask them to respect a discipline, such as not raising a tariff (which we deem to be counterproductive not only to them, but also to the multilateral trading system), so often they say, "Oh, no, we have a balance of payment problem. We are a less-developed country. Don't ask us to assume these responsibilities." We are asking them in the Uruguay Round to assume more of these responsibilities. We are perfectly willing to give them more time to implement the disciplines, but we want at the end of the Uruguay Round to have them adopt the disciplines. Doing so will make our trading system work better for us, for the world, and for them.

We also want a good discipline on government subsidies, one of the most contentious areas in both agriculture and in the industrial areas. And certainly not least on our list is the absolute necessity of having a comprehensive dispute settlement mechanism so that our entrepreneurs feel comfortable that if their rights are abused, they can obtain prompt, efficient and effective relief.

Our agricultural proposal is comprehensive, and at the same time flexible. We do want to guarantee market access, but we're seeking to implement those disciplines over a 10-year period. In seeking to discipline export subsidies, we're asking that nations consider a 5-year phase-out of such subsidies. With respect to internal supports, we propose giving nations basically 10 years to eliminate prohibited supports.

In short, by the 21st Century, we want a world geared to market forces. The Director General of the GATT has called this the "round of competition." The Uruguay Round has us poised at a crossroads. If we are able to implement these disciplines, such as in agriculture, over the next 10 years, we will see worldwide prosperity in the 21st century like the world has never known. If we fail, we face the peril of nations sliding backwards, of looking inward, of contraction in trade, and many, many fewer opportunities for those in the less-developed countries and those just emerging from state-run economies. All we have to do is look at what is happening in Eastern Europe. The choice has never been clearer: our choice is market orientation which has generated unparalleled prosperity in the last 40 years, or government control and intervention which has lead to failure.

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TRADE POLICIES FOR THE 1990's: QUESTIONS*

Ambassador Hills and Secretary Yeutter

AMBASSADOR HILLS: I would now like to take any questions you may have.

SECRETARY YEUTTER: Thank you very much, Carla. We'll take questions now.

QUESTION: How would you compare our relationship to the Common Market with our relationship to Japan?

AMBASSADOR HILLS: In both instances, we are persuading our trading partners to open their markets so as to expand trade. With all of our trading partners, we are exerting leadership to get this done. And we have plenty of opportunity with both the European Community and with Japan to cause market openings. They are somewhat different, but the net result is that where there is a closure, whether in an excluded sector like energy or transportation in Europe or whether it is rice in Japan, the restriction is fundamentally a problem.

Japan has a history of market closure. The world trading system is dislocated incredibly when the second largest market in the world refuses to open up. As an industrialized developed country, Japan imports far less from the developing world than the European Community in aggregate and much, much less than the United States. That does tend to dislocate the trading system when you have a player that is aggressive in exporting and investing, but which has various barriers that prevent a flow of trade based upon price and quality. Market opening is not a request from us for Japan to be altruistic. No one has gained so much from the open trading system as have the Japanese. And to continue to gain from the trading system, Japan simply must open further. So I really think that fundamental reform and market openings must be on their short-term agenda.

QUESTION: Mr. Secretary, it seems amid all this international change that American agricultural could be poised for real expansion. What are your personal feelings of the set-aside programs in the long term and the conservation reserve program in the short term?

SECRETARY YEUTTER: I draw some distinctions between the two. The CRP (under which we take land out of production on 10-year contracts, with some to go into forestry, and some to go into grassland) has been designed to take our highly erodible lands out of production and conserve them for the future. It has significant environmental benefits not only in terms of soil conservation but also in terms of air quality to the degree that forestation is stimulated as a result of CRP activities.

*Based on a transcript.

I have been a strong supporter of the CRP through the years and its predecessor programs designed to preserve some of our very valuable natural resources for future generations. As we move into 1990, however, with more than 30 million acres of land already taken out of production in the conservation reserve -- and clearly with our most erodible lands having been removed from production -- the policy trade-off becomes much more difficult.

Taking additional land out of production through the CRP is going to become increasingly costly. This is done on a bid basis, and the land that would be bid into the CRP in the future will not come in at a rental rate as low as in the past. It is likely to come in at a higher rental rate because it is better land. So the cost will go up. And the environmental benefits thereof will probably begin to diminish, since the remaining land is less erodible.

With something like 34 million acres out of production now and a legislative goal of 40 million, we still have about 6 million more to go under our existing legislative authority and our direction. Some folks would like to see that go up to 50 million. That's going to be difficult to achieve except at substantial additional cost.

The more traditional set-aside programs annually remove some land from production as a part of our farm program apparatus. It becomes increasingly difficult to justify set-aside programs. They cost money to our economy. They spread fixed resources over fewer acres in agricultural production, which means that they reduce our international competitiveness. And they also signal to the rest of the world that we're prepared to remove some of our resources from international competition. And that often stimulates our fellow trading partners to increase agricultural production at the time when we are reducing. That is precisely what happened to us in 1983 when we took something like 80 million acres of land out of production in order to strengthen prices in the midst of an economic depression in American agriculture. What happened is that many others around the world planted a lot more and we just handed them market share on a silver platter. That was not the best policy decision we ever made, and we don't want to repeat that mistake.

So we have to be careful about the kinds of signals we send around the world and the kind of umbrellas we provide for our competitors. To some degree, the program may be necessary for budgetary purposes. Also, I wouldn't strike set-aside programs or set-aside provisions from our laws because we should have as many arrows in our quiver as we possibly can to flexibly design our farm program format here in the United States. Assuredly, there are times when a set-aside is desirable; but I would be very pleased if we could, in the next few years, achieve an outcome through the negotiating process and through other actions to produce a sufficient magnitude of demand generation that we could afford to eliminate set-asides from our policy mix.

QUESTION: Mr. Secretary, earlier you offered a pretty thorough putdown of the concept of U.S. supply management programs. Do you know of a legitimate reason why marketing boards and the like work well for a country like Canada

but would not apply here? And a double-headed question may be related to that: Do you view farmer income support programs as trade distortive? I ask because I think the Ontario Minister of Agriculture is in Washington this week to argue that such programs do not unfairly affect the export price of Canadian farm commodities.

SECRETARY YEUTTER: Some price and income support programs are distortive and some are not distortive. That's one of the reasons we designed the red, yellow and green categories, and we'll argue at the negotiating table in Geneva about what fits into each category. The whole objective of this negotiating process, whether it applies to Canada or the U.S. or to anybody else, is to try to move as many of these policy measures from the red category to the yellow, or from the yellow to the green. That, we believe, will be in the best interest of everybody and particularly in the best interest of those who are the most competitive. As to whether marketing boards are distortive, as I said, let's leave that for the negotiations.

AMBASSADOR HILLS: One of your questions was, how do we feel about supports for farmers? We do not tell our trading partners that they should not support their farmers. What we tell them is that they should not support their farmers in ways that distort trade. If they want to write every farmer a check to the full extent of their treasury, fine. If they want the farm sector to be the richest sector in their society, wonderful. I like farmers, too. What I don't want is for other countries to write a check for their farmers to grow a crop that results in overproduction and prevents U.S. farmers from getting a fair shake in the world market.

QUESTION: Mr. Secretary and Ambassador, with the activities now going on in Eastern Europe and the talk of a possible reunification of Germany, which we all know has had historic strength in world markets, how will this affect the GATT negotiations, and will these activities in Eastern Europe even be contemplated in those negotiations?

AMBASSADOR HILLS: The GATT negotiations involve 97 countries. And there was a decision in 1986, when we and our leaders launched the Uruguay Round down at Punta del Este, that after April 1987 no new members would be permitted to join the GATT, even in observer status. So in the 13 months that remain in the Uruguay Round of negotiations, we will negotiate only with those nations now at the table. However, Hungary is a member of GATT, as is Poland. Although East Germany and the Soviet Union are not, some nonmarket economies did enter the GATT early on. We will proceed with negotiations with 97 countries and, hopefully, achieve gains from increased disciplines that will again show those economies that are run by the state, the economic benefits that come from market forces.

QUESTION: Mr. Secretary, given your comments earlier about set-aside programs being trade-distorting and providing umbrellas for other commodities, how can we still justify having a 5-percent ARP on oats, a commodity that has had to be imported over the last few years to a major degree?

SECRETARY YEUTTER: There were particular trade-offs in each of the ARP decisions made this year. I don't want to go into all the details of that particular process because we were looking at the whole feed grains area as well as oats, and we balanced all the interests that were involved in that particular case and concluded that a 5-percent ARP was appropriate at the moment. But you certainly raise a legitimate point with respect to the way the existing design of our programs discriminates against oats and also discriminates against products like soybeans. The answer is that we ought to try to deal at least with some of that in the 1990 Farm Bill. But I didn't feel that we should try to solve all of those problems in the ARP decision that was made just a few weeks ago.

QUESTION: Ambassador Hills, have you given Korea any firm deadlines to open their beef market?

AMBASSADOR HILLS: We are seeking to achieve an opening in Korea as soon as possible. And as you know, we have proceeded with negotiations that culminated in November with the adoption of a GATT Panel Report which declared that Korea could no longer use balance of payments as an exception to the bans on beef importation. I congratulate Korea because they did adopt that report, which was very difficult for them politically. And now we are engaging in bilateral negotiations seeking to phase in the sort of reform that we have been negotiating over a period of time.

QUESTION: Mr. Secretary, with the predicted rapid growth in world population, I certainly agree with you that we have great opportunities to expand world trade in the next decade. But American agriculture feels threatened in its capacity to produce by the multitude of proposals to take away some vital tools -- the chemicals, pesticides, insecticides -- and the talk of limiting output through sustainable or alternative agriculture. How do you think these will play out in the 1990 Farm Bill or the ones following that?

SECRETARY YEUTTER: There's going to be a tense debate on that point. It is important that everybody in this room be a participant in that debate process because we need to develop some rational policies and rational decisionmaking. I believe rationality is now in some jeopardy. You cited some specific examples. If I have a chance, I'll mention others later in the day. But the fact is, we will have food safety legislation before the Congress next year. We may have other legislation in other areas also potentially limiting for our production capacity.

We have lost perspective on this issue in many cases because of deliberate destructions, and in other cases perhaps simply out of ignorance. I get distressed by the distortions, whatever the cause, whether they be inadvertent or deliberate, and I get distressed when we lose perspective in the policymaking process. It is incumbent upon all of us to try to respond to that challenge if we can possibly do so. Let me just make a couple of points about this if I may without trying to give a speech.

First, we need to keep saying over and over again, because it is true, that farmers are committed environmentalists. I don't know a farmer who is not committed to protection of the environment. There are many farmers, including me, who have been environmentalists a long time before the environmental advocates ever became environmentalists. So I see no reason why we should apologize for what we've done and how we view the environment. I'm as interested in protecting the environment as anyone. But I also believe that we need some sanity in this process. When we begin to discuss dramatic changes in the use of agricultural inputs, we need to understand the trade-offs.

To illustrate the challenge that we all have in getting rational thinking in this area, I'd like to cite a couple of quotations. One of them is in an article in the November 1989 issue of Atlantic Monthly Magazine entitled "Back to Eden." It says: "Although agriculture has given us cities, wealth, the arts and sciences -- what we call civilization; on the whole, it has been a mistake." I just believe that's an irresponsible statement. It becomes particularly irresponsible when it goes on to conclude that correcting this mistake involves switching out of traditional agricultural crops into some kind of a perennial. Apparently what the author has in mind is some kind of prairie grass that would be used to feed the world. I come from Nebraska, and the prairie grasses are buffalo grass. We have a hard enough time feeding cattle on buffalo grass, let alone feeding 6 billion people in this world.

Here's another one, from the National Resources Defense Council cited in a Wall Street Journal editorial on November 14. The spokesperson for the National Resources Defense Council said, "Allowing the EPA to condone continued use of a chemical whenever the benefits outweigh the risks is an absolutely anathema to the environmental community." Now that's a remarkable statement: to suggest that for any kind of health risk whatsoever, no matter how minor -- even if the economic benefits exceed that health risk -- the product still should be banned. We simply cannot throw away benefit-cost calculations in American society. If we are going to do that, we are going to get in deep, deep trouble not only in food production but in a lot of other aspects in our society.

The President's proposal on food safety calls for a change in the so-called Delaney clause which now provides zero residues in products that are determined to be carcinogens. It needs to be changed because we can now measure residues down to one part per trillion. If you follow the rationale of the quote that I've just cited from the National Resources Defense Council, a residue of some particular agricultural chemical that was one part per trillion would ban its use in food production. And when the President's proposal surfaced, we saw all kinds of editorial comment around the world saying what a terrible thing it was for the President of the United States to be proposing a modification in the Delaney clause. I wish the editorial writers would sit down and think about one part per trillion and what it means in this kind of an analysis and why this becomes so ludicrous.

One part per trillion, which most of us cannot conceive, is equivalent to one second in 32,000 years. Now, do we make public policy decisions and ban products that help produce food in this world on the basis of one part per trillion? Let me give you one other illustration that Deputy Secretary of Agriculture Jack Parnell uses. It is also a really good illustration because it has some comparative relevance to the Alar case when we, as a nation, lost perspective earlier this year. This doesn't involve Alar, but it reflects it. And this is one part per billion, not trillion, billion. We've been able to detect that minute level for a considerable time now. If you took one-sixth of an aspirin, a little piece of that aspirin, put it in a railroad tank car full of water, that's about one part per billion. And if you drank out of that tank car of water the recommended two quarts a day, do you know how long it would take for you to consume that one-sixth of an aspirin? Eighty-eight years. Yet we are banning products on the basis of one part per trillion now, not one part per billion. And whether you're talking about eating apples or consuming water or anything else, when it takes 88 years to consume one part per billion, you just have to wonder when we're going to get some sanity into this public policymaking process.

QUESTION: There's talk of granting the Soviet Union most favored nation status. How would that affect ag and non-ag trade?

AMBASSADOR HILLS: Two conditions are required to grant most favored nation status to any non-market economy: first, adopting freedom to emigrate, and second, negotiating a commercial agreement that nudges the country toward market orientation. Were the Soviet Union to be able to adopt over time policies that converted it from a state-run economy to a market-run economy, it could participate in the GATT. And were it to participate in the GATT and were we to be successful in the Uruguay Round, it would be bound by the same disciplines that we are currently seeking. And were that the case, I think that their agriculture would compete on the world market along with other competitive products and we would look to expanded trade in agriculture as well as industry to our mutual advantage. I have a lot of faith in our farmers competitive capacity. Historically, they do very well in worldwide competition.

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AGRICULTURAL POLICIES FOR THE 1990's*

Moderator: Clayton Yeutter, Secretary of Agriculture

Panelists:

Honorable Edward R. Madigan, Representative from Illinois

Honorable Tim Johnson, Representative from South Dakota

SECRETARY YEUTTER: Two members of the House Agriculture Committee join me for this discussion.

On my right is Congressman Tim Johnson from South Dakota. And as most of you know, South Dakota has just one member of Congress; Tim is it. He grew up in the State, graduated from the University of South Dakota as a Phi Beta Kappa and went on and got a master's degree and a law degree from that institution. He was in private law practice in Vermillion, South Dakota, for a time and then got involved in State politics, initially in the South Dakota House, then in the Senate. And then in 1986 he came to the U.S. Congress. He is a member of both the Agriculture Committee and the Interior Committee.

And to my left is Congressman Ed Madigan. Ed goes back longer and has considerably more seniority than most of us in this room. Therefore, we're going to let him start off. Many of you know him personally as the Ranking Minority Member of the Agriculture Committee, and he's also Ranking Minority Member of the House Subcommittee on Energy and Commerce. So he's involved in a great deal of legislation important to Agriculture. Not only on all of the traditional issues that come before the Agriculture Committee, but also issues like food safety.

Congressman Madigan is, likewise, a member of the Republican Leadership in the House and has played a very significant role in all of his party's policy activities in the House. He has the enviable ability to work issues on a bipartisan basis. He is highly respected not only by his Republican colleagues, but by his Democratic associates as well. So it's a special pleasure to have both of these gentlemen with us this afternoon.

We'll start off with the proceedings by turning the microphone over to a long-time friend and outstanding Congressman, Ed Madigan.

CONGRESSMAN MADIGAN: Well, Mr. Secretary, thank you very much for that very, very kind introduction. Ladies and gentlemen, there's absolutely no significance to my being seated to the left of Clayton Yeutter.

SECRETARY YEUTTER: I agree.

*Based on a transcript.

CONGRESSMAN MADIGAN: And I assure you there is no significance to Tim being seated to his right. I think it appropriate that both Tim and I be here because our committee, the Committee on Agriculture, is probably the least partisan of all the committees of the Congress. There is just one other thing I would say, not necessarily in the way of correcting something said by the Secretary, but perhaps as an addendum. He mentioned how long I had been here, and I just thought it appropriate to note that he was an Assistant Secretary of Agriculture when I first came here. So if we're talking about years in grade, you've got them, too, Mr. Secretary. May I add that you are doing a wonderful job and it is a pleasure for me to share this platform with you.

In synch with working on the food safety issue in the Energy and Commerce Committee, we're working on FIFRA, a rewrite of FIFRA in the Agriculture Committee, having more bipartisan cooperation in the Ag Committee on the FIFRA component at this point than we are on the food safety component in the Commerce Committee. But I'm still optimistic about the potential outcome there. And the Secretary and the Department and people from the EPA have been very helpful to us as well as people in the White House as we've worked towards trying to identify what would be mutually acceptable goals in nutritional labeling and a rewrite of the food safety laws and the rewrite of FIFRA. And we have begun the process of thinking about the 1990 Farm Bill, and, in fact, the Secretary and some of his people have been up to visit with Mr. de la Garza and myself to talk about how it is that we will proceed on that.

Mr. de la Garza and I have agreed with the Secretary that in the House of Representatives the mark-up vehicle for the 1990 Farm Bill will be the existing 1985 Farm Bill. Mr. de la Garza and I will introduce that bill. He will then refer the component parts of it to the various appropriate subcommittees of the Agriculture Committee. And as they make changes, if they make changes in those parts assigned to them, we will then interact with Secretary Yeutter in a bipartisan manner that reflects what we hope will be common and mutual points of view as to the directions we should be taking on that bill.

I want to say also that the Agriculture Committee met its budget target, ladies and gentlemen. We were required to save about a billion dollars of some \$14 billion in overall savings. We start out being 1 percent of the total Federal budget and then are asked to make almost 8 percent of the savings. We're quite proud that we were able to accomplish this also in a bipartisan and bicameral way.

SECRETARY YEUTTER: Thank you, Ed. Tim?

CONGRESSMAN JOHNSON: Well, thank you, Mr. Secretary. I appreciate the invitation to the entire South Dakota House Delegation to join you for this conference. We do have unanimity in our delegation always. I've always appreciated, as well, the opportunity to work with Ed Madigan on the House Ag Committee.

Of course, the Secretary inherits the Department of Agriculture at a time when we're going through unprecedented difficult financial circumstances. I think it's understood by almost all that we may find ourselves in a situation where a fair amount of agricultural policy will be dictated more based on its fiscal consequences than necessarily on what may or may not make good agricultural policy. So there's going to be a very difficult balancing that will continue to go on as we try to have the best of both.

The 1990 Farm Bill, of course, is coming. Some differences of opinion arise about the direction it ought to take and what the consequences of the Uruguay Round of the GATT talks will have on whatever product is finally arrived at by the House and Senate in 1990. Whether it will require substantial changes

or not remains to be seen. It remains to be seen what Carla Hills and Secretary Yeutter are able to accomplish in Geneva. However, a number of issues go beyond crop price supports which, of course, are what most of us in the Upper Great Plains often immediately think of when we think of a Farm Bill. We have a broad agenda ahead of us, a very difficult one in terms of what we're going to do with crop insurance vis-a-vis the somewhat semi-annual disaster bills we've been wrestling with. In the 1985 Farm Bill, the conservation and environmental community discovered a very important vehicle for affecting the management of millions of acres that they never dreamed of impacting before, and we found ourselves with the Conservation Reserve Program with the swampbuster and sodbuster conservation compliance provisions. In the 1990 Farm Bill we will be moving on from there, trying to perfect those programs and consider ground water and chemical usage, and so on.

We have a world development component which may or may not wind up in the 1990 Farm Bill. There's independent legislation in the Senate. Chairman English has been wrestling and pulled it off the table recently on the House side. But that may be wrapped into the Farm Bill. We also have questions about research, storage, nutrition and food safety. All told, there's a significant agenda ahead of us that we need to be working on in a bipartisan fashion.

Then, of course, the crop price-support issue is obviously the most contentious and the one on which there is the greatest philosophical difference. There are some who would rather see a fairly significant departure from the 1985 Farm Bill structure, moving more in the direction of higher market prices, perhaps through higher loan rates, perhaps more targeting the farm program benefits to family farms. But I think that it's obvious that President Bush and USDA support a farm bill which will not depart significantly from the 1985 structure, and it's very likely that that ultimate bill will look very much like the '85 Farm Bill with some changes. And what we're going to have to do is see what we can do from my perspective at least, from the Upper Great Plains, to protect farm income. That's a bottom line for me. Obviously we have a Farm Bill for a number of reasons. A big one is to protect the family farm structure in America. I'm afraid

that if we see a continued demise of that family farm structure, all the rest of our goals will be jeopardized as well. So we have some differences of opinion about exactly where the 1990 Farm Bill ought to be going. But I think most of us who inherit some of the populist tradition--mostly Democrats from the Great Plains and Midwest--know how to count and appreciate that it would be very difficult to pass a Farm Bill radically different from anything that President Bush is willing to sign and support. So I think that we're going to make sure that we have a Farm Bill that we can reach a bipartisan agreement on and which does serve the needs of moderate-scale family farmers as well.

SECRETARY YEUTTER: Thanks to both of you for those introductory comments. Let's go to questions.

QUESTION: Are there any areas that are untouchable in the consideration of 1990 farm legislation, or is everything open for negotiation?

CONGRESSMAN MADIGAN: No amendments on congressional salaries. I think that there is a general satisfaction, not universal, but certainly a majority consensus among people of both parties that the '85 Farm Bill has done what we set out to do with it. While it might be desirable to make some changes in the Conservation Reserve Program, and while it might be desirable to give farmers more flexibility in their planting intentions without them losing any of their base acres, the fundamentals embraced in the '85 Farm Bill will not be departed from in a dramatic way.

CONGRESSMAN JOHNSON: I don't know that you can ever say that anything is untouchable. So long as Congress is in session, your life and property is always in jeopardy. Anything can be discussed. But I think that there is a real concern that unless better market prices somehow come about, we are not in a position to do away with crop price supports. We need that bridge so that we don't find our farmers in the worst of both worlds without the market price and without the price supports.

QUESTION: The REAP Group in Virginia--the Rural Economic Analysis Program, had a meeting recently at which time an environmentalist spoke to the group. His statement was, "The farmers of rural America, number one, are the ones creating pollution problems; and number two, the environmentalists have now enough political clout that they will write the 1990 Farm Bill." I wish you would comment.

CONGRESSMAN MADIGAN: Well, first they have to get elected. And then after they've been elected, they have to get appointed to the Agriculture Committee. Certainly they can have an influence with amendments on the floor of the House of Representatives. And they have done that recently on bills relating to water. They've been winning votes by over 100-vote majorities in the House, and I think they are emboldened by that, and that's understandable. But I think if they analyze those votes, they'll find that a majority of people with agriculture constituencies were voting with them on those issues. And if they try in the Farm Bill to go too far afield with

amendments that they might consider to be of an environmental nature, they're not going to get the same votes from the same people that they got on the water bills, or that they expect to get (and probably will get) on the Clean Air Act. So I think it's a different thing. I think that a lot more attention has focused on the water/air quality issues. As they have run for reelection, candidates have been experiencing controversy with air- and water-related environmental issues for a number of campaigns now. That hasn't been true with agricultural issues. There is a heightened awareness with regard to pesticide issues, for example. But still, I don't receive the amount of mail on the pesticide issues that I do on the clean air issues. So I don't think that they should be so confident.

And I think, quite frankly, that we're going to do some things ourselves that will put us in a position to be able to defend what we have done as opposed to what they want to do. And they may not be factoring that in, either.

CONGRESSMAN JOHNSON: I think it's essential that the Agriculture Committee address the environmental concerns in a pro-active fashion. I don't think that basically there's anyone more committed to preserving the soil and the water than farmers and ranchers themselves. That's how they make their living; that's what their children and their families grow their crops from and drink from. And I think that we are obligated to come up with our own alternatives that are workable and doable, that are financially feasible; but ones that do, in fact, address the problems of ground water, problems of chemicals and so on. I think that we can do that. And I think that we can form a coalition of those of us who are committed to agriculture with people concerned about conservation. The conservation movement was around a long time before there was much of an active environmental community. And I would hope that we could avoid the kind of bifurcation of environmentalists on one side and agricultural producers on the other, and instead find that common ground. There will always be some radical direction on either side, but I'm convinced that there's a great middle ground where we can work together.

SECRETARY YEUTTER: If I may supplement that for just a second. I had an interesting letter a few days ago from an individual whom many of you know who said that he just participated with 40 people in a Midwestern roundtable discussion. And when they began the discussion, they asked folks what their particular interests were. They let them prioritize. And of that 40 people, (and this, of course, may not be a representative sample), 2 people out of the 40 put price and income supports at the top of their scale; 25 had environmental issues at the top of their scale. I thought that was a rather remarkable phenomenon. That says to me if it's at all accurate, that we are going to have a lot of debate and discussion with environmental issues next year. And I would simply say that from my standpoint if the environmental advocacy groups take sensible, responsible stances, we will be with them. We want to have a substantial environmental agenda here at the Department of Agriculture. But it has got to be a sensible agenda. And if people are going to march off on irresponsible tangents, then we have no choice but to counter that because it is too important to the country that we do this job right rather than wrong.

QUESTION: Mr. Secretary, you've just been given the green light by Congress to forego a 50-cent price cut in dairy price supports when butter surpluses are in excess of 5 billion pounds. Could you give us some insight as to your thinking on how you feel about whether the price cut ought to be made, and do you foresee a 1990 Farm Bill that uses price support cuts as a further mechanism as a signal to farmers to cut production or do you envision some sort of supply control measure?

SECRETARY YEUTTER: Both of those issues are too complex to cover in detail here, and the decisions would be premature. We will obviously make a decision relatively soon on the dairy price support cut, and we will have views to express on the farm legislation itself at an appropriate time. But no scoops today.

QUESTION: There are a lot of countries right now who don't like our proposal at GATT to reform agriculture. There are also a lot of U.S. commodity groups

who don't like the proposal either, principally because it relies on decoupling, at least to a large extent, government payments from production decisions. As it stands right now, could the proposal that the U.S. proposed pass the Congress as it is?

SECRETARY YEUTTER: First, the comment would be it's not going to come back in that form in any case because this is a negotiation. We are a year from the end of the negotiation, and there's no point in dealing with hypotheticals. I'd be delighted to defend our proposal before the U.S. Congress. I believe I could do so very readily. But the fact is we are going to have to do some compromising on that proposal before we are through. And ultimately Ambassador Hills and myself and everybody else in the Administration will have to defend the entire Uruguay Round package whatever it may be and convince the Congress that it is in the best interest of the United States. I hope we can do that. But I have no idea what the total package will look like by next November. And I have no idea what the agricultural package will look like by next November.

With respect to those who don't like it, I've already commented, as you know, on a number of occasions that the rejection of the American proposal by the European Community doesn't bother me very much because I figure we will reject the Community proposal as well when we see it. So when we are both through with the rejecting process, then we will sit down at the negotiating table and see what we can negotiate. If there's some machismo value in rejection, why let's get those benefits out of the way and go to work. That doesn't trouble me very much.

The fact is, almost all of the negative comments on the American agricultural proposal have come from the European Community and from Japan. There's been a great deal of support for it elsewhere. The objections that have surfaced thus far within the U.S. are generally specific objections, some based upon accurate information and some on less than accurate information. I talked

about that a little earlier. So to the degree that there is either misinformation or disinformation that is affecting the viewpoint of some of our own commodity groups, we ought to be able to correct that by getting the straight story out. We will try to do that as best we can.

I don't have any fear about convincing our own commodity groups of the wisdom of this legislation. Maybe not 100 out of 100, but I'm convinced that we can convince the vast majority of them of the overall merits.

Let me just take two minutes to outline those very quickly. I can't believe that anybody would be opposed to the phase-out of export subsidies because clearly the export subsidies of other nations have dramatically affected our own sales internationally through the years, and removal of export subsidies from the scene over time, whatever number of years might be agreed upon, will, in my judgment, certainly work to our benefit. The same is true of phytosanitary regulations. I can't believe that anybody who seriously thinks about them would object to making them consistent around the world. And when one comes to even the import liberalization, although some of our industries would have to shift to tariffs (sugar, dairy products and others) it is hard philosophically for any of those groups to argue against a tariff approach. But one has to do that by saying they simply don't want to compete in the world. And it's pretty hard to build a case in the U.S. Congress to protect people against competition unless we just want to become a protectionist nation. I really don't believe that we do.

And then that leaves as perhaps the most controversial element the one on which I've had the most correspondence of a negative nature. It is the question of disciplining internal supports. That is, what goes in the red and yellow and green categories. And this gets into the decoupling question. But I think decoupling is a red herring issue. People who want to be opposed to change say it is all decoupling and they're against it. I don't know why decoupling has gotten such a bad reputation, but we ought to just eliminate the word. When we talk about flexibility, everybody's for it; when we talk about decoupling, everybody's against it. There isn't much difference between the two in my judgment. The fact is that the challenge for all of these countries, if one operates in the format that we've talked about, is to redesign our farm programs so as to take them out of the distorted category (up in what we call the red light section and bring them down to the green light section) where they would be, if not totally non-distortive, at least minimally so. That just takes some creativity. My challenge to the farm organizations and farm groups who are here: If you think your programs are going to be red or yellow, figure out a way to make them green. That's what you ought to be doing. And the same thing would apply to the European Community or Japan or anybody else. Go exercise some creativity and some imagination. It doesn't have to be decoupling; there are other ways to get out of the red and into the yellow or green category.

QUESTION: Would the U.S. GATT proposal pass the Congress?

CONGRESSMAN MADIGAN: No, because Members of Congress are not going to unilaterally disarm as far as the relationship with American farmers is concerned. So we would not say, "All right, we'll pass this and we will go

through these motions and then we'll see what you all work out with these other countries." If the other countries were to embrace the U.S. proposal, then I think the Congress would ratify it, if that's your question. And as the Secretary says, he would be willing to sell it to the Congress. I think he could quite ably sell it to the farmers in east central Illinois because I think they sincerely believe in their ability to compete. And they feel that they could compete very effectively in the world if the artificial barriers to their competition were removed. And that's what the U.S. proposal is all about.

CONGRESSMAN JOHNSON: I think South Dakota farmers regard the American position as a negotiating gambit to begin with, and so I think that there is a tendency to be a little skeptical about what the final product of the negotiations will be and what it will truly entail.

There's a number of aspects of the American position that I think most people are supportive of. When you're talking about sanitary standards and so on, there are some things we can be doing. But I think there's great concern that we not wind up with the situation where we have massive plantings of low-cost grain, pull the bottom out from under farm income and then have farm income reliant on some sort of farm welfare system. And I think there is a great deal of concern about that. It remains to be seen what, in fact, we will be handed at the end of the GATT talks. Obviously, all of our farmers would rather prosper from good market prices than at the ASCS office. That's what all of us, both right and left, have been arguing. But there's some skepticism on the part of many that if you have uncontrolled production, that all you're going to have is cheap grain and big profits for grain handlers and a lousy deal for family farmers.

SECRETARY YEUTTER: We have to be careful that we do not underestimate the demand potential in the international marketplace. Clearly, we have to make sure that potential is realized. That's really what this whole exercise is all about. But some of you have heard me articulate the demographics: Whereas we have 5 billion people in the world today, we will have 6 billion 10 years from now, basically the time frame for phasing in the reforms we're talking about in the Uruguay Round. And the question is, who is going to feed those 6 billion, and how much purchasing power will they have? If folks around the world make some of the right policy decisions in the coming years (and the whole situation in Eastern Europe provides some opportunities for that), and if we get more and more people around the world who have learned what a great failure communism is and how much additional economic growth can be generated in free enterprise systems, we can have a pretty healthy situation for agriculture, not only in the United States but in other countries, a decade from now.

CONGRESSMAN MADIGAN: I've had the privilege to visit with a number of agriculture ministers from countries around the world during the past year, including several from Europe. And each of them has said to me that the American proposal is the correct proposal. They've described it as being economically correct and intellectually honest. Now if that's a bargaining position, it's a wonderful place to start. If everybody's acknowledging that

your proposal is economically correct and intellectually honest, I certainly think you have the high ground as the negotiations begin.

QUESTION: You mentioned the overwhelming support for increased flexibility in the next Farm Bill. I'd like both Members of Congress to tell us perhaps how they think the current farm legislation might be modified to provide that increased flexibility, and within that discussion tell us whether or not we might see a return to the NCA (normal crop acreage) concept and a realignment of target prices.

CONGRESS JOHNSON: I think that conceptually there is overwhelming support for flexibility. How can you argue that farmers ought not to have greater options about what to plant, that the preservation of base acreage has grown into an overly rigid artificial system which is not only bad economic policy as farmers are almost forced to plant corn year after year, but bad conservation policy as well. I think this is one area, when conservation and environmental issues come up, where we can play a constructive role by encouraging greater flexibility and getting away from the intensive use of fertilizer and herbicide and pesticides that the current corn-on-corn sequence seems to mandate.

Once you get beyond the concept, however, the agreements begin to splinter off. Each commodity group is obviously somewhat concerned about the immediate impact on its commodity, and there have been a number of alternative proposals. Each of them seems to be subject to some criticism, and I don't know where we're ultimately going to come down other than to recognize that if we're going to address the conservation problems and allow farmers to plant for the market, at least have the option of doing that. If we're going to truly encourage the planting of new crops, then we're going to have greater flexibility one way or another.

CONGRESSMAN MADIGAN: Tim, I think you're absolutely correct when you say that we're just going to have to work on this and watch a consensus develop. I think the consensus will develop. Now people are saying that giving the corn farmers greater flexibility is a great idea. They should be able to plant something else, but I don't want them planting my crop. And we're hearing that, as you can imagine, from everyone.

Among the other issues that are coming to the fore, there is tremendous interest in nutritional labeling. It clearly is a bipartisan consensus in the Congress to move on nutritional labeling. Mr. Waxman and I now have the bill that's through the subcommittee process that we're both sponsors of. And I think that nutritional labeling is going to heighten even more the interest in the low-fat oils, and I could see canola, for example, being a product that we would put on some of those corn acres. I think we'll probably be moving in that direction.

SECRETARY YEUTTER: I would just add that I have some rather strong views on the flexibility issue in terms of trying to generate improvements therein. When I was handling my own farm operations, 15 or 20 years ago, I used to fume about the farm programs rigidities at that time because I was changing my own operation very significantly. The farm programs were just causing me

no end of trouble in trying to make the changes that I knew were sound from an economic standpoint. And so I said to myself then if I ever have an opportunity to influence the make-up of farm programs, I want to get rid of some of those rigidities. And I still feel that way.

We made a lot of progress in this Country in the seventies with the concept that you outlined and some of the others. My personal view is that we retrogressed in the eighties from the standpoint of flexibility. That has generally occurred for budgetary reasons, and perhaps sound ones. But the fact is, whatever the rationale of those changes, we have built additional rigidities back into the system. We are now not too far from where we were 15 or 20 years ago, and it seems to me it is time to swing the pendulum back the other way once again.

QUESTION: Mr. Madigan mentioned using the '85 Bill as the mark-up vehicle. Mr. Secretary, are you comfortable with that arrangement, rather than a brand new approach with an Administration bill?

SECRETARY YEUTTER: I'm very comfortable with that arrangement. We don't know what modus operandi will be used in the Senate Agriculture Committee, so it is conceivable that something entirely different will emerge on the Senate side. But I have confidence in the leadership ability of both Congressman de la Garza and Congressman Madigan and the other subcommittee chairmen and ranking minorities, and I believe we can work very well within that framework and achieve the kind of legislation we'd like to see emerge from the process.

This will be a procedure that will rely heavily, as Ed indicated, on subcommittee activity that, in turn, would mean that the Administration will make our inputs into that process probably subcommittee by subcommittee, with some inputs perhaps coming along at the full committee level. I have no hesitation whatsoever about working within that structure. It makes a lot of sense and we will be happy to do it that way. I don't care about whether the Administration has a high profile in this process. We want to come out with good legislation. Whether the credit goes to the Democratic leadership of the Ag Committee, the Democratic Members, or the Republican leadership or the Administration, or some kind of combination doesn't really concern me very much. I'm more interested in the final outcome. I believe the process that's been outlined is very sound.

QUESTION: Mr. Secretary, how firm are the deadlines in the 1990 GATT negotiations? Is it likely they'll be extended indefinitely or will parts of the GATT proposal be approved and parts not be approved?

SECRETARY YEUTTER: I doubt there will be any extension of the deadlines. As you undoubtedly know, the final ministerial meeting is already scheduled. It will be held in Brussels, not Geneva, the last week in November and the first week of December of 1990. It is always conceivable that a postponement could occur, but I don't expect one. I know the Director General of the GATT is determined not to have a postponement for a lot of reasons. And I see no rationale for a postponement.

What always happens in a negotiation like this is that a lot of skirmishing goes on for a substantial period of time, and then finally people get down to business. It requires then a number of months to get the heavy negotiating done. We are going to get down to business in the Uruguay Round in a very major way (by we I mean the world) in February or thereabouts. According to the schedule outlined by the Director General of the GATT, he would like to wrap up as many of their Uruguay Round negotiating groups by the summer recess, which means by the first of August or thereabouts. Europe, of course, goes on holiday in August. And those that are not wrapped up by then will continue after Labor Day until the end of November. And I suspect from Labor Day until late November you'll see something approximating around-the-clock negotiating to try to do the wrap-up. I really expect it to conclude on schedule.

QUESTION: If the U.S. Congress comes out with the 1990 Farm Bill the first of October if you're optimistic, what do you think its impact will be on the last couple months of negotiations if it's very much like the current Bill with the export enhancement program? How do the rest of the countries take the U.S. proposal serious if the U.S. Congress has just extended the same time type of principles and export subsidies?

SECRETARY YEUTTER: That doesn't trouble me very much. That's a question that's asked with some regularity, and I suppose if Members of Congress were making statements accompanying that legislation that were antithetical to the GATT negotiating process, that could stir significant concerns among our trade partners. So part of it depends on the tone of voice of the Congress as an institution and the individual Members, particularly in the Ag Committees. The same would apply to other elements of the negotiations with respect to any legislation that might be coming through other committees of Congress, food safety as an example.

But assuming that we can go through the 1990 political debates without generating a lot of international hostility in the process, I would not see the 1990 Farm Bill as adversely affecting the negotiating environment. Everybody in Geneva knows that we must pass a Farm Bill in 1990 because our existing legislation expires in 1990. Everybody knows that we will need to modify that legislation in 1991 if the Uruguay Round succeeds. We'll have to modify a lot of other U.S. legislation at that time--not just the Farm Bill. But it's conceivable that we would need to modify dozens of pieces of legislation as a result of the outcome of all 15 negotiating groups.

This is not an unprecedented situation. We went through something of the same nature back with the Tokyo Round. I don't see anybody in Geneva getting too terribly shook up about this. So I see it working out just fine as long as our negotiators (Ambassador Hills and her crew) can convince our trading partners that we can take whatever package is ultimately agreed upon and have it approved by the U.S. Congress.

If the debate or the tenor of the debate in any way jeopardizes the negotiating process through convincing people that congressional approval is not likely to occur, then we have another situation. But Ambassador Hills and her negotiators will have to handle that situation skillfully.

CONGRESSMAN MADIGAN: There will be a number of Members of Congress who will be saying during the enactment of this bill that they are aware that it may have to be changed and would be supportive of those changes that will lead to us having access to markets that we presently don't have.

So there are going to be people talking perhaps from both sides of this issue as the Farm Bill moves forward. And then the people in Geneva can be listening to whoever they want to listen to.

SECRETARY YEUTTER: I should add that Ambassador Hills and her staff are not going to blindside anybody in this room or the Congress on what happens in Geneva. There will be innumerable consultations between USTR and the relevant congressional committees; not only the Ag Committees, but Ways and Means, Senate Finance, and a lot of the others between now and next November. And there will be lots of consultations with people in this room.

Presumably that will generate the necessary consensus for the ultimate work product. We went through a similar exercise, of course, with the U.S.-Canada Free Trade Agreement. Some people said to us as that process unfolded, "You're never going to get that agreement approved. Everybody's going to get all disturbed about the implications that it has for U.S.-Canada trade."

We handled that process through intense consultations with Members of Congress, intense consultations with the U.S. private sector, and as you recall, it passed overwhelmingly.

QUESTION: Earlier you said that you would support environmental groups if they proposed reasonable and rational changes for a more environmentally friendly agriculture. One of the things that environmental groups are talking a lot about is imposing water quality plans on farmers similar to what Congress did in the '85 Farm Act on highly erodible land, the conservation plans that are in effect now. Do you consider that as a good method or approach to promoting environmentally sound agriculture, and what would you do to get participation by farmers who don't have direct Government farm benefits, such as dairy, hog and specialty crop producers?

SECRETARY YEUTTER: A very complicated question. I'm not sure that we know enough at this time to make that kind of legislation appropriate. Farmers don't want to contaminate their ground water supplies or anybody else's ground water supplies. After all, they consume that water at home; it's for their own families and the families of their next-door neighbors. So everybody would like to avoid ground water contamination. I don't think anybody even needs legislation to bring about prudence in that area.

But beyond that, how would that legislation read, what would one ask farmers to do and where? I'd want to see the specific legislation before drawing any conclusions. Some caution is in order because there's a lot we do not now know about movement of underground water sources and about how underground water sources are contaminated. I did my Ph.D. dissertation on water law and water administration, so this is not an unfamiliar subject. I can assure you

that we don't have all the answers as to how water moves through the soil, how other products applied in farm production move through the soil, how far they move before they reemerge, how far the underground water supplies shift at given points in time, what causes that to happen, and a lot of other things. In other words, we may well need some additional research before we start imposing regulatory demands on farmers or anybody else.

CONGRESSMAN MADIGAN: Well, the FIFRA Bill that we have in the Ag Committee in its present form has been supported by, I believe, 26 environmental groups. The Food Safety Bill that we have in the Commerce Committee has perhaps only three issues outstanding within that bill that would keep environmental groups from supporting it. And perhaps we can work those things out. I hope that we work out both food safety and FIFRA outside the Farm Bill.

With regard to water quality as it relates to surface water, and as those questions arise dealing with chemical run-off, and fertilizer run-off particularly, Mr. English and Mr. Coleman have some ideas about taking the remaining acres in a conservation reserve program and dedicating those acres to creating buffer zones to prevent the run-off from agriculture fields into surface water supplies.

So, these are activities that Members of Congress of an agriculture persuasion are involving themselves in. And I think that it demonstrates there's clearly an environmental awareness, and we're working with the Secretary. Mr. de la Garza and myself have discussed all of these things with the Secretary on more than one occasion.

CONGRESSMAN JOHNSON: I think any proposal needs to be put on the table and given serious consideration; but until we see a concrete proposal, it's hard to know what our response ought to be. But in the meantime, I think we ought to move aggressively forward as Ed has mentioned with the FIFRA and with food safety issues with possible modifications in the CRP Program, with the base flexibility which would, in turn, significantly affect chemical usage. And there are a number of other things we can be doing in the areas of well testing, in the areas of farmer education, as well as in the research area. It remains to be seen where we're going to come out on this. I suspect that there's no magic bullet, there's no single solution to the ground water problem. The important thing is that we continue moving forward on it, and I think the agricultural community is trying to do that at this point, and do it in a way that environmentalists can agree with.

SECRETARY YEUTTER: Particularly with respect to underground water, Congressman Madigan is right about surface contamination. It's a lot easier to get a handle on that issue because it's tangible and visible. But when we're dealing with underground water, we have to be very careful that we do not impose regulatory requirements that are simply unfair. It is assuredly possible for someone to find contaminated water below one's land and discover that all of that contamination came from somebody far away, maybe as much as several miles away. So we have to be careful where the sanctions apply. Do we hold the landowner responsible for contamination that's occurred because of someone several miles away? That's something we better think about carefully.

QUESTION: Obviously, the majority of the political influence or pressure on Congress for the contents of the Farm Bill comes from the farmers, the farm organizations, and so on. But as you discuss these other issues here like food safety, environmental issues, pesticides, and as Mr. Madigan mentioned, there may be an importance of separating these issues in the legislation. Is there a significant change in the proportion of political source of support for the Farm Bill, or are the farmers maintaining comfortably the same margin as in the past?

CONGRESSMAN JOHNSON: One doesn't have to be a demographic expert to tell what's happening on the House side as we have fewer and fewer Members from rural areas, and those from rural areas find their districts less rural than before. We've had a decline in the number of farmers and ranchers across the country. And that may have some significance. On the other hand, the farmers are better organized and more politicized than ever. They are more articulate, and they better understand the consequences in their daily lives as to the decisions made in Washington.

So I think that it cuts both ways. They need to be more aggressive and more articulate than before because of what's happening to the overall numbers. And I'm convinced that basic farm policy is still going to be based in large part on the input that farmers and ranchers themselves have on the decisionmaking.

CONGRESSMAN MADIGAN: The question presumes that farmers and environmentalists don't have a mutuality of interests. I think the contrary is the case. No one is more aware of and adept at dealing with soil conservation issues than a farmer, or water conservancy issues than a farmer. The mindset of a farmer is to be the steward of the soil and to husband the water supplies. You can't take people with that mindset and presume or presuppose, rather, that they have no interest in the environment. The environment is their life. And I don't feel that they want to use chemicals that shouldn't be used or that they want to use them in quantities beyond the proper quantities. As I talk with farmers, I find them talking to me more and more about chemical issues and expressing more and more concern about how long these things last in the soil, and must they last that long, and what is USDA and what are the land grant universities doing about developing chemicals with a shorter life. And I've had a farmer come up to me and raise questions to me about synergism in the soil: Is the soil the medium that allows two chemicals in that soil to create some third substance? Sometimes I feel like I'm going to have to go back to school and get a degree in chemistry or microbiology to campaign in the farm community.

The fact of the matter is these are very astute people, they're very aware people, and they're very concerned. I think that they have a mutuality of interests with the environmentalists. There is some work that needs to be done to bring them all together. But I think that's our challenge.

SECRETARY YEUTTER: A lot of people still underestimate farmers in terms of their adaptability, the rapidity of their response to change, their level of sophistication. As you know very well, the American farmers are very sophisticated today. That's one of the encouraging attributes of our farm

population and our whole agricultural sector. So when it comes to an issue like the environment, if there is any possibility to adjust input practices, for example, reduce the level of chemicals or fertilizers or whatever, they're going to make that decision on the basis of good management long before the U.S. Congress is going to mandate it through legislation.

So to me, suggesting that the only way to get control of some of these environmental kinds of issues is to legislate the requirements or the sanctions or the remedies, is just nonsensical. Farmers will simply do it as a question of good management if at all affordable. If they cannot afford to do so, people are going to have a hard time mandating it legislatively because no Member of Congress is going to want to put all of his constituent farmers into bankruptcy.

QUESTION: A little earlier today the Secretary expressed his views on the necessity for balancing risks and benefits in setting tolerances for pesticide residues on foods. This is a big issue coming up in discussions before the Energy and Commerce Committee. And another issue that he discussed was the question of desirability of setting a figure at which the public would accept risk, like one in a trillion, one in a billion. What are your views in terms of the result of mark-up, or you might say, your expectations as a result of mark-up with the House Energy and Commerce Committee?

CONGRESSMAN MADIGAN: I'm sure that Mr. Waxman will want a number in there, and the number will probably be ten to the minus six, or one in a million. The EPA doesn't want a number in there because it's not an exact kind of thing. The one in a million is a supposition. And it's impossible to enforce suppositions. If we have language that requires EPA to assess the risk and to assess the benefits and to make judgments on a case-by-case basis, there would be a lot more enforcement. The Delaney clause is almost non-enforceable because of the manner in which it's drawn. Mr. Delaney offered the clause as an amendment on the House floor years ago at a very tragic moment in his life when his wife had just died of cancer. It was adopted in a very emotional atmosphere. It isn't good law; it has never been good law. And to put in some other numerical qualification in its stead isn't going to be any better law.

We have to have some confidence and some trust in the people at EPA to administer the laws intelligently. We ought to give them the kind of language that enables them to do that. But as I said, there are probably three issues within the food safety bill that would keep us apart at this moment, and that's one of them, convincing the environmental community that the EPA would administer to a greater degree a law that provided them with a more commonsensical approach to that question.

SECRETARY YEUTTER: As Congressman Madigan indicated, the EPA approach, which is also the USDA approach and the Administration approach, would call for removal of the Delaney zero risk standard and replacing it with a "negligible risk" standard. And as Congressman Madigan indicated, it is very likely that Congressman Waxman and others would insist that the term "negligible risk" be mathematically defined in the legislation. Our view is that we get in trouble

when we try to put numbers in the law because it is a fast-changing world, and we would be much better off defining negligible risk through regulation rather than legislation.

QUESTION: Many specialty crop farmers are facing a loss of EPA registration for their input chemicals because the chemical companies simply won't pay the cost of the increased testing that they have to perform to maintain the registration. How can Congress help address that issue?

CONGRESSMAN JOHNSON: I'm not sure what the answer is. As we continue to wrestle with the FIFRA, modifications of FIFRA, it has to be done in that context. I would hand it back to Ed as our resident expert on FIFRA and what's going on there.

SECRETARY YEUTTER: That will all come up legislatively next year, of course, in the modifications of FIFRA. The Administration proposal has some recommendations in that regard. There will be a lot more debate before this is finalized, but certainly implicit in your question is the point that we need to achieve some certainty and some dependability of the law so that people aren't guessing what the government will or will not do. And I hope we can achieve that through the legislative process. It will not come without a lot of intense public debate, of course.

CONGRESSMAN MADIGAN: If a chemical company is not willing to go to the expense of re-registering a particular compound, then some people would wonder if the company has doubts about the future of that compound. There has to be a greater degree of communication between individual chemical manufacturers and the Members of Congress involved in that particular piece of legislation before those questions are answered.

SECRETARY YEUTTER: Thank you all for participating so actively and vigorously in this program this afternoon.

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You heard Michael Boskin tell you about the Administration's hopes for the economy. He's clearly an optimist who says that the glass is completely full, not just half full. He looks for rapid growth, and in spite of that rapid growth, he hopes for declining inflation in the medium term, stable inflation in the short term. He contrasted those views with some private sector pessimists who dare to use the "R" word, recession, who feared that we might indeed be in a slump today. I'm not really in that pessimistic camp. I think that the economic glass is two-thirds full today. I think there is only one chance in three that we will lurch into a recession in 1990. So I think that the farm community really shouldn't focus their fears on a burst of high interest rates, creating a credit crunch that then sends the economy into recession. I also think they don't have to worry about the economy self-destructing without any help from the Federal Reserve. I think that we are in the midst of a rather shallow, well-controlled wave of real growth and inflation and that's the scenario that I will try to convince you is the most likely case today.

Let's look at the positive signs for the economy that can be readily seen by a rational observer today. First of all, the consumer is very confident. If you look at the University of Michigan's survey of consumer attitudes about buying intentions for durable goods, cars and homes, you find a very sophisticated consumer ready to buy when the price is right. This consumer knows that he is going to win the game of chicken with the auto manufacturers until they give good incentives again: low interest rates or special price deals. The consumer is not going to buy cars in the volumes that the big three or their competitors from overseas would like. Therefore, it doesn't trouble me at all to see auto sales quite weak in the last month or so. This is simply the result of a canny consumer confronting the auto industry. Once the industry decides to battle for market share with lower prices, the consumer will be ready to respond. The consumer has rarely, if ever, led us into a recession and I don't think that will happen today.

Another sector that I think is positive is housing. We saw a steady decline in mortgage rates over the summer, continuing into the fall. In response to that decline, we have seen sales of existing homes respond quite nicely. They have been rising for five months. I have been disappointed that new construction activity has not bounced back. We have a slightly weary home building community, particularly in certain areas like the Northeast where there is a glut of multi-family construction. For the Northeast, we at DRI do in fact use the "R" word. The Northeast is in recession this year, but

*Based on transcript.

housing nationally is poised to rebound next spring or even earlier when the weather permits.

I am confident that housing will build the base for a recovery like the one Michael Boskin describes later in 1990. My difference with his scenario is really not fundamental. The Administration has hoped for stronger growth than I anticipate, and I think that we'll see a little more weakness. Real growth in the fourth quarter of this year will be very close to zero. Special factors will determine whether we have a brief dip or just very meager growth.

The final positive sign that I want to alert you to relates to the so-called booming sectors that may go bust, exports and capital equipment. Coming down in the plane this morning, I noticed that Business Week described exports as a declining sector. Then I read the fine print of the article and discovered that they were not talking about exports declining, only rising at a less rapid, more manageable, more sustainable pace. We have recovered tremendous market share overseas. In 1980, the U.S. enjoyed 26 percent of global export markets. With the overvalued dollar, by 1985 that was down below 20 percent. Now we're back up to 26 percent and headed higher. That rapid double-digit growth we saw in exports from 1986 through 1988 wasn't sustainable, but it was a regaining of market share. It's only natural that, with the dollar now low and even firming, export growth would settle down to around 4 to 5 percent. So I look at that as a good sign, not a sign of impending recession.

Likewise, the fact that capital spending is no longer likely to move ahead at a double-digit pace is not a sign that the American business community has lost confidence in this recovery. Capital spending rose so rapidly for so many years that we were creating tremendous extra capacity every year. Because investment is different from consumption, it adds to capacity, it doesn't just use a resource. If the business community feels that the economy is moving into a slow growth mode, they are likely following historical patterns to simply keep investment about level with the previous year. That doesn't mean they think the economy has stalled, it means they think they need to add the same amount of capacity as they added in prior years. So I don't look at the obvious reduction in the positive growth rate of capital spending as a sign that we are headed for a recession.

Now what about some negatives? I think the main thing we have to fear is fear: if some special factors in the fourth quarter produce a decline in national output, and the news media say that the sky is falling. If they convince you or me that we're about to be laid off, we could respond by trying to build a large nest egg to protect ourselves. Or businessmen could respond by sharply cutting back purchases of equipment or construction; then this recession fear could be a self-fulfilling prophecy. So I am very concerned that some special factors in the fourth quarter could create a fearful atmosphere. Let me tell you what those special factors are so that if a weak number comes out you'll say, "I'm not worried."

First of all, I already told you about the auto campaigns. If auto manufacturers stay stingy through the fourth quarter, auto sales will be depressed, but then the incentives will come back full force and we will get a mini-boom in autosales in the beginning of 1990. Second, the strike at Boeing, a tremendously large company relative to our economy, is big enough to influence fourth-quarter GNP dramatically, not just in production, but exports and durable equipment sales. We know, however, that since the strike is settled it will be a positive factor for the first quarter. The San Francisco earthquake reduced employment and production. Those losses are lingering. They will depress the fourth quarter but exhilarate the first quarter as we bounce back. And finally there is some perverse measurement of capital spending in the wake of tax reform that will artificially produce a reported decline in capital equipment spending. And now that you and I are forewarned about all those special factors, we won't panic when we hear the fourth-quarter GNP number. Let's hope that the news media and everyone else doesn't panic. If so, then I think we will make it through a nice shallow wave.

One way to describe what this economy is going through is to talk about a vehicle downshifting. I coined the phrase "soft landing" in 1985, so it's my right to find another one. Think of the economy as having been in fifth gear in 1988. It's easy to defend. Real GNP expanded 5 percent from the end of '87 to the end of '88. In 1989, because interest rates were boosted rather dramatically by the Federal Reserve during the course of '88, we've downshifted to about 3 percent growth. We made it to third gear. We are now about to drive in first or second gear for the next three or four quarters. Real GNP growth in the fourth quarter will probably be a half percent and then it will pick up to a point and a half in the opening quarters of 1990. I think that there is only a small chance, as I said, that we accidentally lurch into reverse.

Let me try to put some more numerical flesh on the skeleton of the economic cycle that I have laid out for you. I'm an economist, they'll pull my membership card if I don't give you more numbers pretty soon. As I said, real GNP growth in 1988, on a calendar year basis, was 4.5 percent. This year it will be 3 percent. Next year it will be 1.5 percent. A nice, orderly transition, that's the U.S. picture. If you look overseas, the combined GNP of the major industrial nations rose 4 percent in 1988. We look for just a little bit lower, about 3.5 percent for 1989, and then a decline to 2.5 percent growth for 1990. The business cycle will be at least a year later in Germany than here, and at least a year to a year and a half later in Japan than in the U.S. We don't have a synchronized global cycle and that will help moderate our domestic business cycle.

These aggregate numbers, though, hide some sharp sectoral shifts. The growth rate of expenditures for business equipment has been declining: 12 percent growth for 1988, 5 percent for 1989, and only 2 percent for 1990. Exports grew 18 percent in 1988--with tremendous market share gains--followed by 11 percent for '89 and 5 percent for 1990--downshifting but not into reverse. This downshifting has already produced and will continue to produce, a decline in interest rates. The decline in interest rates has built a base for housing such that residential construction will expand at a slightly more

than 5 percent pace next year. That will provide the energy to get the whole economy going by the end of next year. Other major sectors of our economy will follow the lead of the exports, business fixed investment, and residential construction. Consumer spending will downshift and imports will tail off as our total domestic spending moves to a lower gear. The final sector that I haven't mentioned is that of state and local government. How do they behave, what energy are they going to add to the economy? They are much like you and me. When they've got income they spend it; when they don't they continue to spend it for another year and then they cut back. So this year actually will be a year of pretty high state and local government spending, but budget crunches will force some curtailment in 1990.

In this shallow wave environment, the bad news I have to tell you is that core inflation is not falling. Core inflation is about 4.5 percent. It will be knocked down a very small amount as the unemployment rate rises by perhaps a quarter to a half a point over the next year. That small rise in unemployment is not great enough to materially affect the compensation demands of the workforce. It's not enough to force a shifting back to security issues, job security issues rather than pay gains. We already have total compensation rising at a 5.5 percent pace and it will go up pretty close to 6 percent with the major increases in medical costs, the impact of the minimum wage, etc., passing through. When total compensation rises at 5.75 to 6 percent and national productivity growth is only about 1.5 percent, it's obvious that inflation, the prices that depend on those labor costs, will be moving ahead at 4.5 percent. That's not necessarily tolerable to the Federal Reserve for a sustained period, but they really aren't ready to counter-attack yet because they don't believe there is a genuine constituency for pain. At 4.5 percent inflation, nobody is screaming for the Federal Reserve to take control of the economy and save us as occurred in 1980. I don't think the Federal Reserve will make a preemptive strike in the next year or two and that's good news for the agriculture sector with its heavy debt burdens.

Interest rates, as I said, will cycle down in 1990. For example, the treasury bill rate (three-month borrowing costs by the Federal Government) was slightly over 8 percent for this year, and it will be down to about 7 percent next year. That's good news because other short-term rates like the prime rate will move down as well. Mortgage rates will come down another half-point over the next six months. But then unfortunately as the economy comes back led by housing at the end of next year, the Federal Reserve will certainly allow interest rates to pop back up again, following real growth back up because inflation has not come down. The risks in the medium term, therefore, relate to some more policy experiments that might be pursued by the Federal Reserve or by the Congress and Administration.

The first experiment I have in mind is, as you may be aware, that there is a congressional resolution being considered that the Federal Reserve should target zero inflation within five years. And Chairman Greenspan has said he

doesn't see a fundamental problem with that. Now partially that's the responsibility of a Federal Reserve Chairman to always say that he is in favor of zero inflation. His card in the central banking community would be pulled if he didn't say that, but what if he actually tried to achieve zero inflation? I guarantee that we wouldn't avoid substantial pain. We would have a recession much like we had in the early 1980's. It takes a substantial increase in unemployment to curb inflation in this economy. There is no easy route. So I am concerned that maybe three or four years from now if I were giving this speech I would be warning you that the Fed is about to make a preemptive strike on inflation and trying to bring it down, particularly if Congress had pressured them with a resolution saying you must hit an inflation rate of zero within five years.

Now another experiment may be performed even sooner: relating to the Eastern European developments, a tremendous and prompt reduction in defense spending. Secretary Cheney has outlined a \$180 billion reduction in defense programs over the next three to five years. How big is that? That is enough to balance the Federal budget by 1995. Our baseline, our most likely scenario, however, says that isn't achieved. Instead we foresee a deficit of around \$125 billion. But if in fact, we do forecast approximately a 5-percent reduction per year every year through 1995 in weapon systems and procurement and about a 1-percent to 2-percent reduction in manpower, that would reduce defense spending by about \$100 billion by the end of that period. Combined with the lower interest costs, that would balance the Federal budget. What does that mean for the agricultural community?

A rule of thumb to remember when you are considering how much pressure to put on your Congressman for deficit reduction is that each \$50 billion of deficit reduction brings a full point reduction in interest rates. So you can imagine an environment where interest rates are two to two and one-half points below where they might otherwise be, if we are able to achieve a defense reduction of that magnitude and still have national security concerns met. So that's actually a very positive development that could occur and in fact might make the Federal Reserve much more comfortable with the economic growth in a noninflationary vein.

I have outlined a scenario of a shallow economic cycle, with real growth descending from 4.5 percent in '88, to 3 percent in '89, to 1.5 percent in '90, and then popping back up. Inflation only rises a little during this shallow wave, interest rates go down and pop back up, but it actually is a remarkable job of fine tuning that the Federal Reserve with collaboration from others in Washington have managed to achieve to keep this economy and this expansion alive.

DEPUTY SECRETARY PARNELL: Dr. Brinner has time to take a few questions.

QUESTION: Some argument has been made that Japanese companies are gaining on U.S. companies because they have cheap funds available for their research and development. Do you subscribe to that, and do you think that any lowering of interest rates here perhaps might correct the problem?

DR. BRINNER: The question was: Do the Japanese have a substantial advantage because their credit costs are lower and in particular does that lead to a much more aggressive research activity? I think the answer is clearly and definitely, "yes." There is talk about the U.S. being short-sighted. Actually, we tend to be long-sighted and entrepreneurially minded. But when we have a cost of capital that has been as high relative to our inflation rate as it has been during the eighties, we are rationally and correctly going to be short-sighted. We should follow the market signal of a high cost of credit and discount actions which will only bring benefits in the future more than we would if, like Japan, we had a cost of capital, which after tax and after inflation, is negative. So I don't believe either that the American manufacturing or business community is short-sighted or that they are being dominated by some perversities of rookies on Wall Street. I think it's because they are responding to very high interest costs and the best thing that could happen is for our credit costs to be reduced through a re-balancing of the Federal budget deficit.

QUESTION: If defense spending is cut and defense orders are cut back by \$5-10 billion next year and then \$50 billion out a few years, what takes the place of that production in the economy?

DR. BRINNER: The scale that Secretary Cheney appears to be indicating is a \$15 billion reduction say for fiscal '91, plus or minus, mounting to \$30 billion, \$40 billion, and so forth, as we go on down the line for the following years. It all depends on the Federal Reserve as we try to bet on what sectors will fill in that gap. If the Federal Reserve promptly responds by expanding the supply of credit, then capital spending, consumer durables and housing will--with only say a year's lag--fill in the gap and we will make a substitution for defense spending of investment and consumer durable spending. If on the other hand the Federal Reserve says, "I'm tired of 4.5 percent inflation; I worry that it's headed up rather than remaining stable," it might take the opportunity to let the economy cool a little bit before it eases. In that case, nothing would fill the gap until say '92 or '93, and we would have, instead of a rebound in growth in '91, some more prolonged sluggishness. So the Federal Reserve gets to make the decision of how soon we fill in the gap for defense spending, assuming Congress doesn't find something else to spend the money on that's saved on defense.

QUESTION: Do the levels of debt in the economy, the tremendous level of consumer debt, business debt, and government debt, concern you for the longer term should we enter a recession?

DR. BRINNER: No, I am not concerned about the levels of debt we have in the U.S. economy. The consumer has built up that debt at a less rapid pace than his wealth has increased. The net worth of the consumer has been increasing year after year. The stock market boom was justified. The bond market boom, coming off the early eighties was justified, as well as the housing price boom. All of those things have built up the consumer's asset side of the balance sheet more rapidly than the liability side. So unless we go into a profound recession which knocks down, at least temporarily, those asset values, the consumer really is not overleveraged. You may think that American manufacturing firms are overleveraged, but in fact they are merely

moving more toward a Japanese or a European mode, where the equity holder is taking more risks. And in fact junk bonds should be thought of as just a different name for equity. Junk bonds are tax-deductible equity. So I really am not overly concerned about this economy and its current debt levels. I don't think that we have a greater systemic risk of recession because of those higher debt levels, because the Federal Reserve knows that we are more highly leveraged. If the Federal Reserve were oblivious to that leverage, then in an effort to slow down the economy, they might pump up interest rates just as high as they did in the past to achieve a given degree of restraint. But now that they know that the economy is more leveraged, the Federal Reserve Board members and the bank presidents know that they have more leverage on the economy, that a given rise in interest rates will slow down the economy more. So I'm definitely in the optimistic camp that feels this debt has as many pluses as minuses.

QUESTION: What does your scenario do for the value of the dollar?

DR. BRINNER: I believe that the dollar is poised to decline. It is riding high against the yen, not because of economic fundamentals but because of the problems of the LDP, their ruling party. The LDP is eventually going to become less newsworthy and it is going to be clearly seen that it is not relevant for financial decisions. As the finance community starts to ignore the LDP problem, the yen will rise against the dollar. The mark already has, and as our interest rates decline, that will further push down the value of the dollar, making us more competitive in many markets. I expect a gaining of market share in 1990 and '91 based on a declining dollar.

Thank you very much.

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WORLD AND U.S. AGRICULTURAL OUTLOOK

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Overview

The world agricultural outlook is highlighted by rebounding commodity output, rising consumption and falling crop stocks. World crop production is recovering from last year's reduced level; but for most crops, production will not match continued high levels of use. In 1990, world animal product output will expand, led by much larger U.S. poultry production. World commodity consumption will reach a record level in response to larger output, continued economic expansion and population growth. Commodity prices will be supported by strong demand and a working down of crop stocks, although feed grain and oilseed prices will ease from last season's drought-driven levels.

This outlook suggests U.S. farmers can look forward to another year of favorable income. Increased marketing receipts are anticipated because of larger commodity output and higher prices for some commodities. At the same time, production expenses will stabilize with lower feed costs. Even with smaller direct Government payments, producers will make cash farm income of \$52 to \$57 billion in 1990. This would be 2 to 4 percent higher than our latest estimate for 1989. Net farm income of \$44 to \$49 billion would be 2 to 5 percent below 1989's record, reflecting a smaller expected increase in the value of commodity inventories in 1990.

The 1990 food outlook calls for larger supplies and lower prices. Record meat production, bigger crops and slowing inflation will hold the retail food price increase to 3 to 5 percent in 1990. For 1989, food prices will rise nearly 6 percent, due to lingering effects of the drought in the first half of the year.

U.S. crop output is likely to increase in 1990 as acreage expands and yields trend higher. In the 1990's, export demand for U.S. agricultural products should expand in response to expansion in international markets resulting from economic growth and GATT trade reform.

Global Setting

World commodity production is increasing in 1989/90. Crops are recovering from drought-reduced levels in the United States, Canada and Argentina. Animal product output will reach a new record as poultry supplies continue to increase.

World commodity consumption is moving to record levels and will exceed production for most crops. Use will respond to: real economic growth of 3 to 3-1/2 percent; meat output 1 percent larger; and population up 1.7 percent.

These factors have strengthened international demand for U.S. agricultural exports in international markets; but U.S. grain and oilseed exports will face increased competition from expanded production in other countries. U.S. grain exports will be down slightly because of a rebound in crops and exports by Canada and Argentina, near-record exports by the European Community and tighter U.S. food grain supplies.

U.S. soybean exports will face record South American production. A smaller crop is indicated for Brazil, but the Argentine crop will be up sharply with expanded acreage and higher yields. Early indications point to a record low U.S. share of the world market. In contrast to grains and soybeans, the U.S. share of the world cotton market is expected to recover from last season's reduced level. Competition is easing in international markets as cotton supplies decline in foreign exporting countries.

Commodity Outlook

The global crop outlook is for larger supplies, growing use and generally lower but continued relatively strong prices. The world livestock and poultry outlook is for further expansion in supplies, notably for poultry.

For the United States, total grain use will remain above larger production (Figure 1). Cotton use is well above the crop, while soybean use will not match production.

Wheat

The global wheat outlook for 1989/90 is highlighted by record production, largely unchanged world trade, and a further decline in stocks. Much of the gain in world production is being offset by lower carryin stocks, leaving supplies only up marginally. With 1989/90 use advancing to a record, stocks will drop again. Exportable supplies are up in several of the major competing exporters, resulting in a drop in the U.S. share of world wheat trade (Figure 2).

World wheat production for 1989/90 is forecast up 6 percent from a year earlier to a record level. Foreign output is forecast up almost 6 percent as larger crops in Canada, China, the European Community, the Soviet Union, and several other countries more than offset lower production in Turkey, Eastern Europe, and Australia. The production gains are more than offsetting a 13 percent drop in foreign 1989/90 beginning stocks, leaving foreign supplies (production plus carryin stocks) up 2 percent. However, with U.S. supplies down more than 10 percent, world supplies are less than 1 percent above 1988/89.

The outlook for U.S. wheat in 1989/90 is for higher production, lower carryin stocks, smaller exports and ending stocks possibly slipping to their lowest level since 1974/75.

U.S. Total Grains

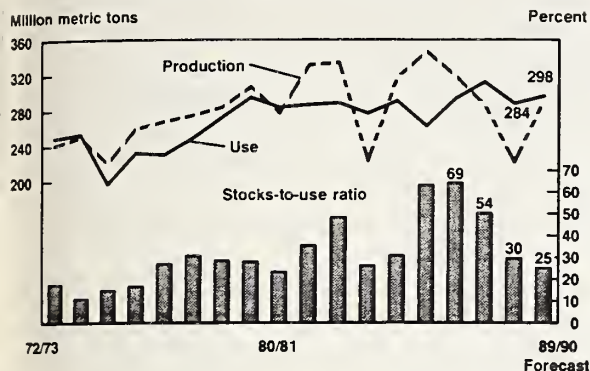


Figure 1

World Total Grain Trade

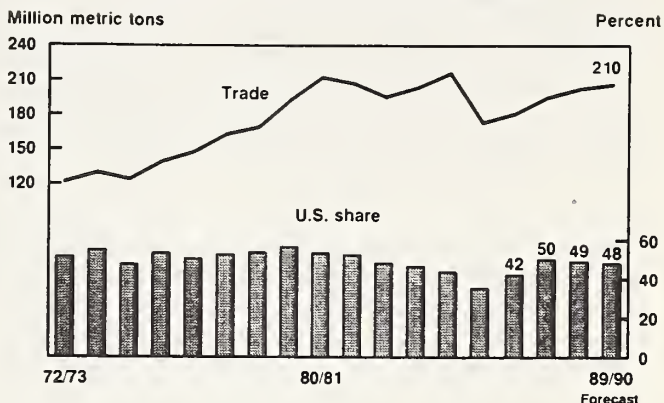


Figure 2

U.S. Soybeans

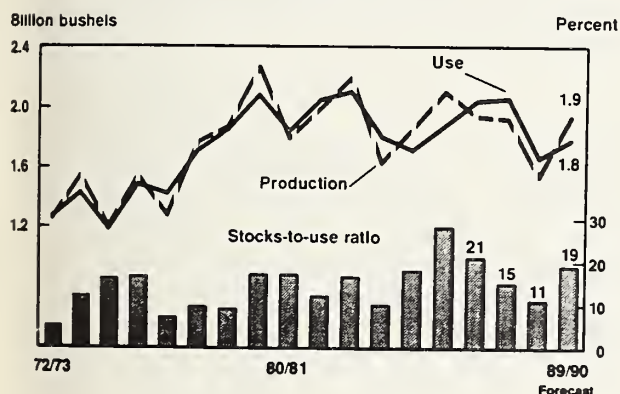


Figure 3

World Soybean Trade

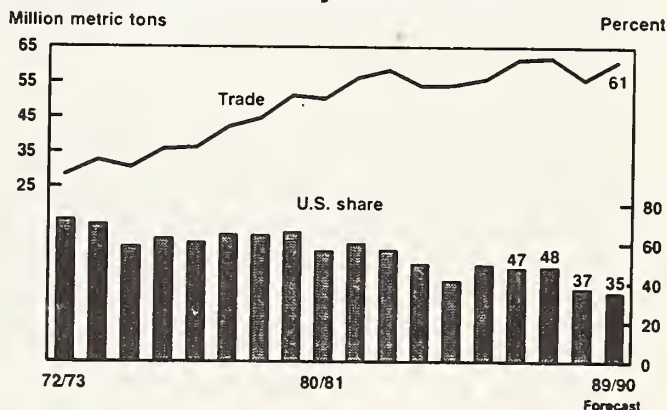


Figure 4

U.S. Cotton

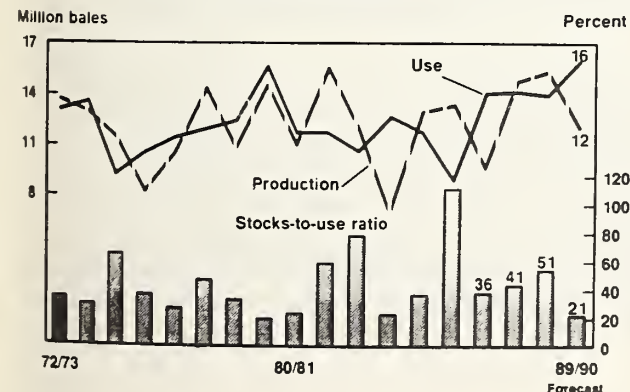


Figure 5

World Cotton Trade

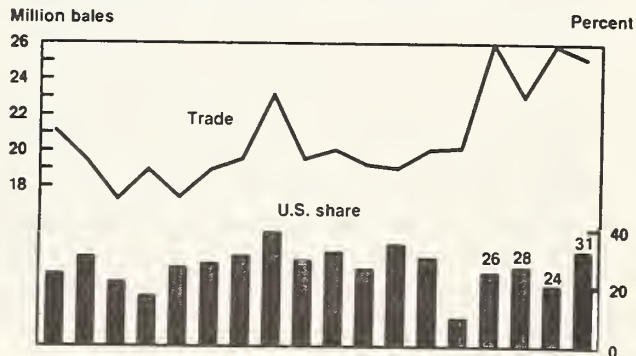


Figure 6

U.S. harvested acres, at 62.1 million, are up 17 percent from 1988 to the highest level since 1985. However, production was only 13 percent above 1988 as yields dropped to their lowest level since 1978. Unfavorable growing conditions in the Great Plains dropped winter wheat production by 7 percent from a year earlier, despite a 13-percent increase in planted area. Spring wheat and durum, however, showed a dramatic rebound from the drought-reduced 1988 crops -- up 142 percent and 107 percent, respectively. With carryin stocks down 45 percent, U.S. 1989/90 supplies are more than 10 percent below a year earlier. Domestic use is forecast up around 7 percent as food use, seed use, and the feed and residual disappearance expands. The major factor now determining 1989/90 carryout stocks will be exports.

World wheat trade in 1988/89 dropped more than 7 million tons from the previous year's second highest level ever, but little change is expected in 1989/90. Last year's wheat imports by the USSR dropped 6 million tons from 1987/88 and accounted for the lowest share of world trade since 1979/80. A larger USSR wheat crop, continued strong world prices, and public pressure in the USSR to reduce wheat imports are projected to reduce 1989/90 wheat imports by the USSR to 12 million tons. This would be the lowest level of USSR imports in a decade. World trade outside of the USSR and China is forecast up 3 to 4 million tons in spite of relatively high world prices and continued high debt in many importing countries.

Weather outside the United States has played less of a role in determining wheat production this year. Canada's production is up 50 percent from last year's drought-ravaged crop, although the crop was less than earlier expected because of an extended period of hot, dry weather. Argentine wheat area is up in response to relatively strong world prices. Also, weather conditions have been generally favorable, and Argentine production is forecast up more than a third from last year. In Australia, planting weather was less favorable as it remained too wet in some areas to seed the crop. Also, potential yields were recently reduced by an extended period of hot, dry weather. For the European Community, the wheat crop largely escaped the abnormally warm, dry spring and summer, which cut the yields of spring planted crops dramatically. EC wheat production is forecast up 6 percent from last year to the second largest wheat crop ever. In addition, the crop is reportedly of the best quality in years. Canada, Australia, and Argentina will export as much as available supplies allow, and the EC exports are expected to match last year's record. Thus, U.S. wheat exports are estimated at 1,275 million bushels, down 10 percent from 1988/89. With world trade forecast to decline only slightly, the U.S. share may drop to 36 percent compared with 39 percent in 1988/89.

U.S. wheat production should rebound strongly in 1990, spurred by relatively strong prices and reduced acreage reduction requirements. The relatively high world prices could also result in larger foreign production, although the increase may be more constrained than in past years. Some of the land which has been taken out of wheat production since the mid-1980's may be slow to come back into production. In some countries, such as Australia, the land has been switched to other profitable farming activities.

Rice

Global rice production in 1989/90 is forecast at a record level, up 1 percent from last season's bumper crop. A favorable monsoon over most of south and southeast Asia resulted in record yields for many countries in the region. Large crops are expected in China, Bangladesh, Indonesia, Vietnam and Thailand. However, unfavorable weather in parts of India and Pakistan will likely reduce yields from last year.

U.S. production and stocks are down from a year earlier, especially for long grain rice. U.S. rice exports totaled about 86 million cwt. in 1988/89, up 19 percent from a year earlier and the highest level since the record level of 1980/81. An increase in world import demand, combined with competitive U.S. prices, boosted U.S. exports in 1988/89. Exports are expected to fall to 79 million cwt. in 1989/90 because of an expected decline in world imports. The U.S. market share is expected to remain at 19 percent in calendar year 1990.

Given normal weather, global rice production should expand next year and prices decline further. Over the next several years the marketing loan program will ensure that U.S. export prices are competitive. However, as long as U.S. supplies remain tight, exports will have to compete with expanding domestic use.

Coarse Grains

The global coarse grain outlook for 1989/90 is highlighted by larger supplies but a further decline in stocks, especially in the United States. World coarse grain trade will continue to rise in 1989/90, following last year's 13-percent increase. Larger imports by the USSR, South Korea, China, and several smaller importers are forecast to result in the largest world coarse grain trade since 1984/85. U.S. exports are forecast up around 4 percent, led by a gain in corn.

World 1989/90 production is forecast up 11 percent from a year earlier because of larger U.S. and foreign crops. Foreign output is up around 1 percent as larger crops in Eastern Europe, the USSR, Argentina, and Canada more than offset lower prospective production in the EC, South Africa, and a number of other countries. Foreign 1989/90 beginning stocks are little changed from a year earlier but U.S. carryin stocks are down over 50 percent, resulting in world supplies only 1 percent above 1988/89.

The outlook for U.S. feed grains in 1989/90 is for sharply larger production. However, reduced carryin stocks and expanding use dropped ending stocks to their lowest level since 1984/85.

This year's corn crop, at a little under 7.6 billion bushels, is up almost 2.7 billion from last year's drought-reduced crop and the largest since 1986/87. Harvested acres are up 12 percent as planted acres were up 7 percent and more acres were harvested for grain. Most of the increase in

production, however, is due to a sharp rebound in yields from 1988's drought-reduced level. Yields are up 38 percent from 1988, the largest year-to-year rise since 1948. Production of the other feed grains are also up, ranging from a 9-percent gain for sorghum to 69 percent for oats. Lower 1988 production and expanding exports dropped 1989/90 carryin stocks for corn 55 percent below a year earlier. However, the carryin stocks of corn were still more than 900 million bushels above the carryin following the 1983/84 drought. Lower prices will likely lead to some increase in domestic use, while exports will rise with expanding USSR corn imports.

World corn trade rose significantly in 1988/89, and a further gain of more than 6 million tons is forecast in 1989/90. Despite a larger USSR grain crop, procurements of grain by the government from Soviet producers have been less than expected. Given the intense public pressure in the USSR to raise livestock production and since world corn prices are competitive with the other feed grains and feed wheat, Soviet corn imports (October-September trade year) are projected to be up around 2 million tons from the large 1988/89 level. Larger corn crops and exports are forecast for Argentina and Eastern Europe, plus South Africa will market much of its large 1988/89 crop in coming months. However, exports by China and Thailand are expected to decline from 1988/89 levels. Thus, the United States is expected to capture 60 percent of the year-to-year gain in world corn trade. Also, if there are further reductions in plantings in Argentina from current forecasts and weather problems surface during the growing season in Argentina and South Africa, U.S. corn exports could be even larger.

U.S. corn production should show additional gains in 1990. While 1989 yields are up sharply from 1988, they remain below trend. The higher world prices might also result in some increase in foreign coarse grain production, although there are a number of factors which may lead to more constrained increases by some of the competing exporters. In Argentina, the potential expansion in corn will depend on prospective costs and returns relative to oilseeds. Expansion opportunities are also limited in Thailand because of land constraints and expanding domestic use. On the other hand, a return to normal weather should lead to higher coarse grain production in the European Community.

Oilseeds

Global oilseed supplies and stocks are rebounding in 1989/90, due mostly to a recovery in soybean production from drought-reduced levels in the United States and Argentina. U.S. soybean production is gaining 25 percent while Argentina's soybean crop next spring could be up nearly 60 percent if near-normal yields prevail. The large gains are only partially offset by reductions in China's and Brazil's soybean crops. Reduced credit availability and lower producer returns are expected to cut Brazilian soybean acres by 5 percent or more. World oilseed production, other than soybeans, may fall slightly in 1989/90, with smaller rapeseed crops in the European Community and Canada and smaller peanut crops in China and India.

With global oilseed supply gains concentrated in soybeans, a high meal content seed, soybean meal equivalent supply-use balances may expand

significantly. Vegetable oil supply-use balances will likely show some tightening even though world palm oil production will likely reach record high levels. While growing conditions continue to be generally favorable for palm in the major producing countries, vegetable oil markets could become quite sensitive to any changes in growth prospects for palm in these areas.

World soybean meal use prospects in the year ahead point to expansion, mostly due to lower prices and little growth in availabilities of competing protein feeds. Most significant gains are forecast for the United States where animal feed consuming units, particularly poultry, are rising modestly and feeding profitability remains attractive. Elsewhere around the globe, only a very modest rebound is foreseen in the European Community, the largest meal consuming market, as livestock feed units show only a small recovery following a drop in 1989 hog production. While other important markets, such as Eastern Europe and the Soviet Union, are likely to grow some, near-term political, financial and budget uncertainties will likely limit their gains. Selected developing countries, like Mexico, will likely show rapid growth in soybean meal use, but recent slowing in some Pacific Rim country users may persist into 1989/90.

For the United States, soybean use will be up but remain below the crop (Figure 3). The soybean crush is forecast to rise 5 percent in 1989/90, helped by domestic meal use gains while U.S. soybean meal export prospects are flat. Soybean exports are forecast to rise about 8 percent; but this is a weak recovery from the lows reached in 1988/89, as increased competitive supplies abroad meet much of the growth in soybean meal use (Figure 4). Improving crush margins abroad, along with some tightening in vegetable oil supply-use balances, favor soybeans rather than soybean meal in the import mix, particularly in Western Europe.

With U.S. ending stocks in 1989/90 forecast to reach about 335 million bushels, season average farm prices will decline to \$5.00 to \$6.00 per bushel, down about 25 percent from 1988/89. Soybean meal prices could fall about 30 percent for the year, while soybean oil prices may be down only slightly.

Looking ahead to 1990/91, lower prices for soybeans are likely to keep soybean area expansion in check in the major producing countries. Area planted in the United States may decline to near the 1987/88 level of 58 million acres, mainly due to lower producer returns. A more flexible wheat planting program may also entice acres away from soybeans in 1990.

Cotton

Prospects for 1989/90 are for global cotton consumption to moderately exceed production, drawing stocks down to 25 million bales--the lowest level since 1983/84. Fueled by larger use in the United States, Pakistan and India, world consumption is projected at a record 86 million bales, up 2 percent from last season, reflecting strong cotton demand and competitive prices. Although down slightly from 1988/89, trade of 25 million bales is the third highest on record. Production is off 4 percent this season to 81 million bales, owing primarily to smaller crops in the United States (down one-fifth) and the Soviet Union (down one-tenth).

With world cotton stocks projected to equal only 30 percent of 1988/89 use--a post World War II low--prices have increased sharply. During the first 3 months of this season, the world price averaged 82 cents per pound, one-fourth higher than last season's average and the highest level in 5 years. Prices will remain sensitive to uncertain crop prospects in China and the Soviet Union, which together account for nearly one-half of world production. With 1989/90 U.S. cotton production forecast at 12.1 million bales, down more than 3 million from last season, and use projected at a 30-year high of 16 million bales, stocks are falling dramatically (Figure 5). The carryover may total 3.3 million bales, less than one-half the beginning level. While mill use is expected to be up 5 percent to 8.2 million bales, U.S. exports are projected up one-fourth to 7.8 million bales as foreign export supplies tighten (Figure 6).

The early-season outlook for 1990/91 points to the likelihood of some rebuilding in U.S. cotton stocks. Production should recover sharply as acreage responds to the recently announced smaller reduction requirement of 12-1/2 percent for participating producers. At the same time, this season's higher cotton prices likely will result in increased competition from manmade fibers and foreign cotton next season, dropping prospective U.S. use below 1988/89 levels. Even so, U.S. mill use and exports should remain relatively high.

Livestock and Poultry

World animal-product output likely will increase a little over 1 percent in 1990 following an expected rise of nearly 1 percent for this year. Most of the increase in both 1989 and 1990 is the result of expanded poultry production. Total poultry meat production will continue to increase in most countries. Following a 5 percent gain in 1988, world pork production is expected to show little change in 1989 and 1990. World beef and veal production is expected to decline slightly this year and hold at about the same level in 1990.

Total meat production in the United States in 1990 is expected to increase about 3 percent from this year's record large output. The increase in 1990 meat production will come largely from the poultry sector where output is expected to continue the upward climb. Both beef and pork output are expected to increase about 1 percent next year.

The U.S. cattle inventory at 99.5 million head was about the same on January 1, 1989, as it was a year earlier and at the lowest level since 1961. Little change is expected in the inventory at the beginning of 1990. The cow inventory on January 1, 1989, was up slightly from the previous year. The indicated calf crop for 1989 is slightly lower than the previous year. Placements of cattle on feed this year have fallen below last year's level, and the number on feed at the beginning of 1990 could be around 5 percent below the year-earlier level. Placements are expected to increase in 1990 and support a small increase in fed cattle slaughter. The increase in fed cattle slaughter is expected to more than offset a small decline in

nonfed cattle slaughter and beef production could rise slightly. Increased beef exports and population growth should more than offset the production increase and per capita consumption could decline. Cattle prices may rise slightly (Figure 7).

Pork production may increase about 1 percent this year (Figure 8). Producers slowed their expansion in response to higher feed costs that resulted from the 1988 drought. Production this fall has dropped below the year-earlier level and hog prices have strengthened. With current hog prices above last year's level and feed costs lower, hog producers are seeing more favorable returns. This may result in hog producers expanding pork production by the fourth quarter of 1990, and for the entire year production may be up about 1 percent.

Poultry meat output continues to trend upward with both broilers and turkeys showing gains this year. Broiler producers have continued to achieve good returns even though broiler prices in the last half of this year are down from a year ago. For the year, broiler prices may average slightly higher than in 1988. Production is expected to increase again next year and prices likely will be lower than this year's average (Figure 9). Turkey producers had poor returns last year, but they improved in the first half of this year. Improved returns and expectations for lower feed costs have resulted in expanded output since the first quarter and for the entire year production may increase around 6 percent. Prices have come under the pressure of the larger output in the last half of 1989 and may average nearly 10 cents per pound lower than a year ago. Production likely will continue to show strong increases in the first half of 1990.

Egg production will decline about 3 percent this year as producers responded to an extended period of poor returns. With the sharp drop in production, egg prices have been substantially above the year-earlier level and producers have had a year of favorable net returns. These improved returns are expected to result in expanded output in 1990 with the largest gains coming in the last half of the year. This will result in lower egg prices next year.

Dairy

Milk production during 1988/89 was up less than 0.5 percent as poor forages and high concentrate costs resulted in output per cow during the summer dropping below the year-earlier level. Milk supplies have tightened, and with a good demand for cheese and large commercial exports of nonfat dry milk, prices have risen. Producers are expected to respond to the higher milk prices and milk production likely will show an increase later in 1989/90. For the year, production may rise 1 to 2 percent.

Commercial use in 1988/89 was nearly unchanged from the 1987/88 and 1986/87 level. Commercial use is expected to recover in 1989/90 and could more than offset the gains in production resulting in a decline in Government purchases of dairy products under the price support program.

U.S. Beef

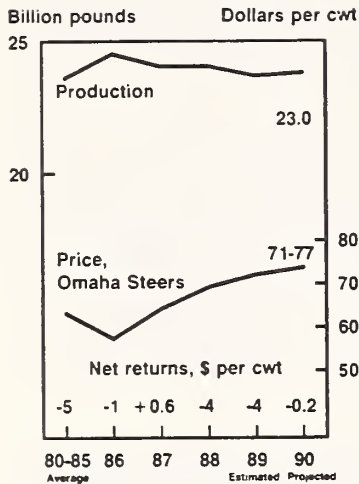


Figure 7

U.S. Broilers

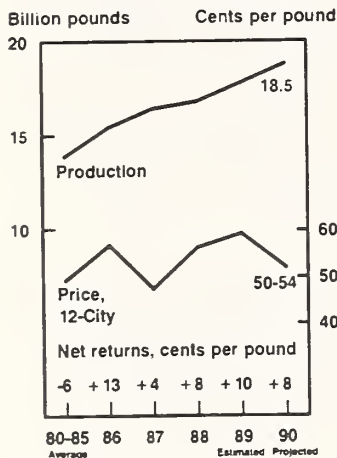


Figure 9

U.S. Pork

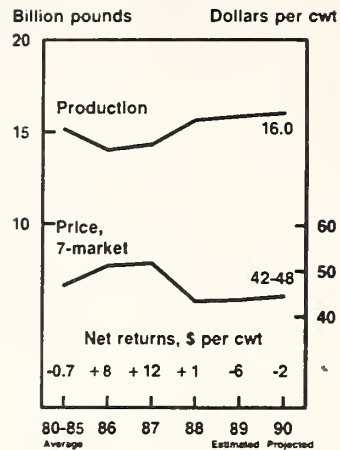


Figure 8

Cash Farm Income

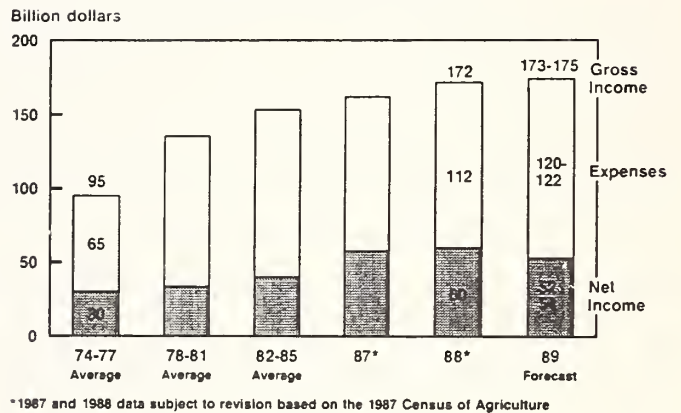


Figure 10

Changes in Consumer Price Indexes Percent

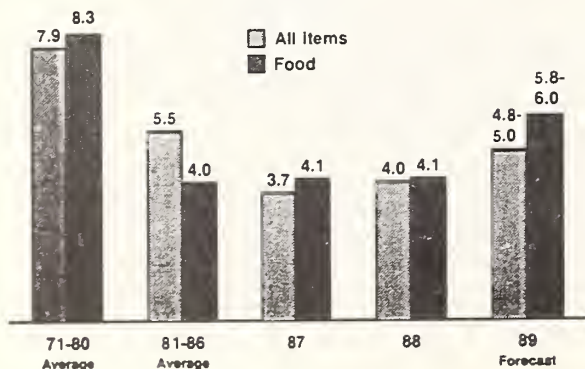


Figure 11

Crop Area Harvested Plus Conserving Uses

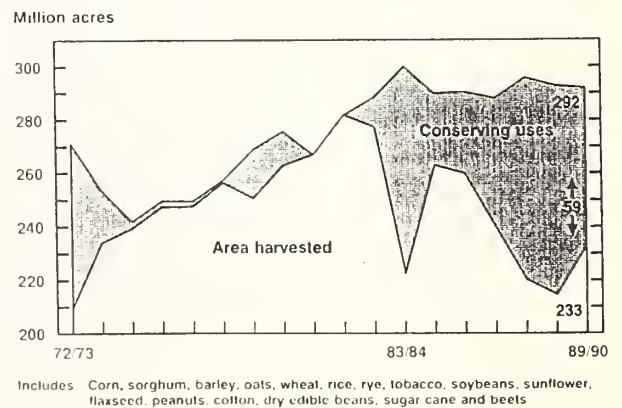


Figure 12

Sugar

U.S. sugar production is forecast up slightly to 7.0 million short tons in crop year 1989/90. Nevertheless, this year's output will be about 350,000 tons below the record level produced 2 years ago. Cane sugar production will be somewhat lower than last year's high, but beet sugar production will increase 5 percent compared to last year's drought- and disease-reduced output. Deliveries of U.S. sugar for domestic consumption, which had been on a 9-year slide until 1986/87, has expanded each year since then and may expand another 1 percent this year. Forecast at 8.3 million tons, 1989/90 deliveries would be the largest in 6 years and a further indication that the substitution of corn sweeteners for sugar has leveled off. On September 12, 1989, the U.S. sugar import quota period was extended by 9 months from the initial January 1-December 31, 1989, to January 1, 1989-September 30, 1990, concurrent with an increase in the quota from 1.24 million short tons to 2.19 million short tons. To ease the prospect of a tight supply in fourth-quarter 1989, shipping patterns were adjusted to allow 150,000 short tons of the quota increase to enter during October-December 1989.

World sugar production for 1989/90 is projected at 105.7 million metric tons, slightly above last year and the fourth straight record. Gains in the United States, Eastern Europe, the USSR, India and Indonesia more than offset reduced crops in the EC, Thailand, Brazil and Cuba. Consumption, forecast at a record 108.2 million tons for 1989/90, will exceed the record harvest by 2.5 million tons. The expected decline in global sugar stocks during the year would represent the fifth drawdown in a row. The stocks-to-use ratio at the end of 1989/90 is forecast at slightly below 17 percent, even lower than the ratio for 1980/81 when prices averaged 22.4 cents per pound. Currently, world prices are in the 14-15 cents per pound range. The tightening of the world production and consumption balance reflected in diminishing stocks suggests that significantly higher prices are possible. However, a higher world price level could dampen potential increases in global sugar consumption, most notably in India, and several developing importing countries, especially China.

U.S. Farm Income and Food Prices

Larger commodity marketings and dampened production expenses should mean a year of increased income to farmers. Consumers will find large commodity supplies and slower inflation, suggesting only moderately higher food prices.

Farm Income

In 1989, net cash farm income will total \$52-\$54 billion (revised downward to reflect higher production expenses indicated by the 1987 Census of Agriculture). Receipts are rising some 4 percent, but production expenses will be up much more and Government payments will be smaller (Figure 10).

In 1990, the outlook is for slightly higher receipts, while expenses may stabilize. Marketing receipts will move up in response to bigger crops and

higher prices for some commodities, while gross income may be up less than cash receipts because of lower Government payments. Production expenses may stabilize, mainly because of lower feed costs. This would suggest net cash income of \$52-\$57 billion, up 2 to 4 percent from 1989.

In contrast to the increase in cash farm income, net farm income of \$46-\$49 billion would be 2 to 5 percent below 1989's record \$48-\$50 billion. Net farm income takes into account an expected smaller increase next year in the value of commodity inventories.

Food Prices

Retail food prices will rise nearly 6 percent in 1989, up from the 4.1-percent gain in 1988 (Figure 11). The 1988 drought caused retail food price rises for some products, mainly in the first half of 1989, including cereals and bakery products, fats and oils and processed vegetables.

For 1990, a food price rise of 3 to 5 percent is in prospect. Record meat supplies and the likelihood of bigger crops next year will moderate food price rises. Too, marketing costs will increase less if inflation eases to around 4 percent, from 5 percent this year.

U.S. Crop Production in 1990

There are two developments that point to larger crop production next year: An easing of requirements for Government program participation; and higher prospective yields.

Acreage to Expand

In 1989, U.S. producers set aside from production 59 million acres (Figure 12). Some 29 million acres, nearly one-half of this total, are under annual programs. So, the lowering of acreage reduction requirements for program participation in the wheat and cotton programs will bring some of this land back into production next year.

For wheat, the acreage reduction percentage is 5, down from 10 for the 1989 crop, and a new option allows producers to plant up to 105 percent of their base. For cotton, the percentage is 12.5, down from 25. For corn, the percentage remains at 10.

Higher Crop Yields Likely

Crop yields remained slightly below trend this year, reflecting drought damage to the winter wheat crop and less than normal conditions for several other crops. Subsoil moisture conditions in the Corn Belt are much improved over a year ago. Also, technology adoption and improved production practices should continue to add to productivity. Yields are trending upward about 1.5 percent per year.

For the combined crops of wheat, feed grains and soybeans, the projected trend yield for 1990 is nearly 2-1/2 percent above the yield level realized

in 1989 (Figure 13). Even with reduced soybean production likely, combined grain and soybean production could be up 5 to 7 percent next year if trend yields are realized and harvested acreage is up 3 to 4 percent.

Expanded acreage and higher yields suggest bigger wheat and feed grain crops next year to meet expanding markets and permit some addition to stocks.

U.S. Exports to Grow in the 1990's

Economic growth and an easing of trade barriers in the 1990's would stimulate world consumption and agricultural trade, particularly for developing countries. U.S. agricultural exports would stand to gain in view of more than ample crop production capacity to meet market needs at home and abroad.

Developing-Country Imports to Expand

Market trends offer some insight into changes in U.S. exports that could be expected in the 1990's as a result of continuing economic growth, GATT trade reforms and a new U.S. farm bill.

If we look at shares of combined global wheat and coarse grain imports by the economic regions, we find that developing countries take 50 percent of imports, the largest share, and an increasing share from earlier periods in spite of debt and other financial problems (Figure 14).

In contrast, imports by foreign industrialized countries have averaged only 20 percent in the second half of the 1980's, down from 36 percent in the 1970's -- the European Community has shifted from a major importer to a major exporter.

Imports by centrally-planned economies now average 30 percent, a bigger share of the global total than the 27 percent in the 1970's but very slightly less than the 31 percent in the first half of the 1980's.

U.S. Exports Could Expand to Developing Countries

An examination of U.S. exports to these same regions shows that developing countries have taken an increasing share of U.S. exports -- 49 percent of the total in the second half of the 1980's, up from 46 percent in the first half and 34 percent in the 1970's (Figure 15). These countries would appear to be good potential markets for U.S. exports. The pace of their imports should pick up as economic recovery continues and financial constraints are eased by increased exports, aided by market access gained under GATT trade reform.

Countries with centrally-planned economies now account for 25 percent of U.S. exports, above the 20 percent in the first half of the 1980's and slightly above the 22 percent in the 1970's. In the years ahead, these countries may undertake major economic reform to become less dependent on imports to meet rising demand. Still, continued large imports are likely over the next several years, particularly coarse grains for the Soviet Union and wheat for China.

In industrialized countries, the U.S. share of 26 percent is well below 34 percent for the first half of the 1980's and 44 percent in the 1970's. GATT trade reform could well result in a reduction in agricultural support and protection and permit an expansion in trade for industrialized countries. For example, lower grain prices in some countries would stimulate use and dampen production, resulting in larger imports.

In summary, global grain trade is likely to increase in the 1990's in response to economic growth and trade reform. The United States should be in a good competitive position to take advantage of the growth in global trade.

Index of U.S. Crop Yields Wheat, Feed Grains and Soybeans

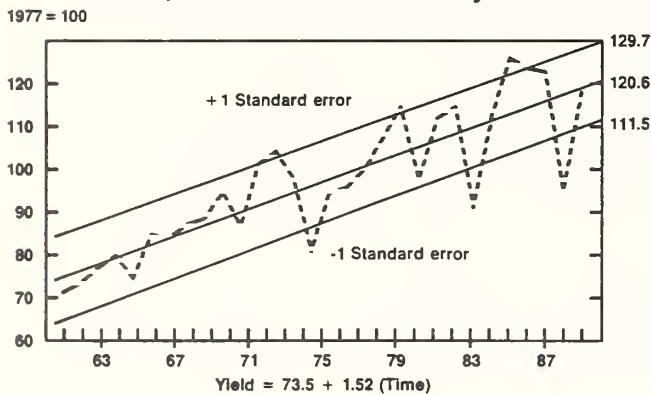


Figure 13

Foreign Wheat and Coarse Grain Imports Share by Economic Region

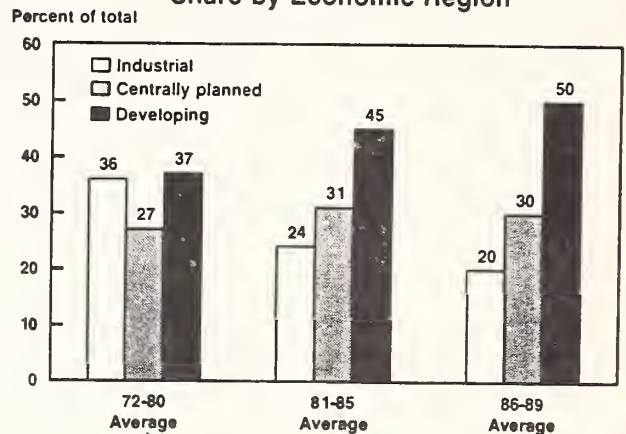


Figure 14

U.S. Wheat and Coarse Grain Exports Share to Economic Region

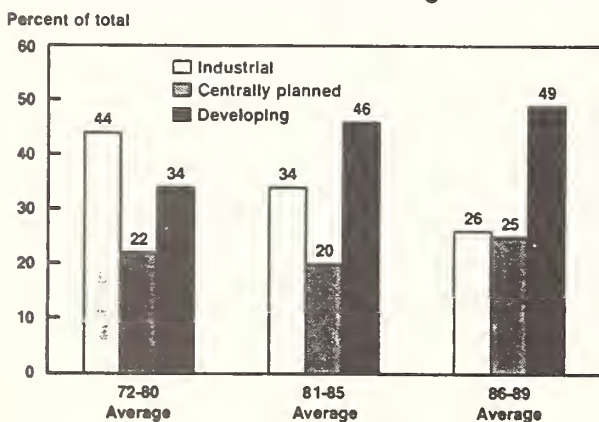


Figure 15



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

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AGRICULTURAL TRADE OUTLOOK AND ISSUES

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It is a tradition here that we release the first USDA export forecast for the new season at our annual Conference. Presenting this forecast must have been a great pleasure -- a privilege much coveted by speakers -- during the soaring 70's. The 1980's, as you know, haven't been nearly as kind to U.S. exports.

I wish I could say, on the opening day of this Conference, that we have saved the best news of the afternoon for last.

I am pleased to report that fiscal year 1989 ended with the highest U.S. agricultural export value since the record 1981 season -- nearly \$40 billion worth of U.S. farm products going to other nations. I can tell you that since 1986, the low point for this decade, our export value has climbed an impressive 51 percent.

Export volume for 1989 was just under 148 million metric tons. This is about a half-million tons lower than the 1988 figure. Even so, we have seen our export tonnage recover rather dramatically over the last few years. Total volume of agricultural exports shipped in 1989 was up 38 million tons from the depressed level of 1986.

Our agricultural trade surplus (exports minus imports) topped \$18 billion in 1989, the highest in 4 years and more than triple the surplus recorded back in 1986.

Fiscal 1990, the first year of the new decade, began on October 1. Our forecasters say we'll probably see a slight decline in export value this year, following 3 consecutive years of gains. Season-average prices for coarse grains and oilseeds will be down from the drought-inflated levels we experienced during the 1988/89 season. These lower prices will trim the value of U.S. agricultural exports.

Export volume may also be somewhat lower, held down mainly by a recovery in wheat production abroad and an overall reduction in world wheat trade.

In general, our bulk products will tend to dampen U.S. export earnings this

year. By contrast, our high-value agricultural exports are expected to set still another record.

For the longer term, the decade before us seems to offer much promise. That promise, however, can only be realized if we, together with our trading partners, choose wisely. Here and abroad, we must choose policies that maximize the potential for economic growth and expanded trade. As the old Chinese proverb reminds us, opportunity may knock, but we have to answer the door, greet it, and make it feel welcome.

Outlook by Commodities

I will talk a little bit more about the choices and opportunities ahead. But, first, let me share some of the highlights of our 1990 export outlook at this early point in the season. I'll start with the major commodities.

In **coarse grains**, we have experienced growth of more than 13 percent in the total volume of world trade over the last 4 years. The new year is expected to bring another increase. World trade volume is forecast to rise around 5 percent. The United States may get close to half of that growth, perhaps about 2-1/2 million tons on top of the 61 million we exported in 1989. This would result in the largest U.S. export volume for coarse grains since 1981.

The Soviet Union is driving much of the trade growth. Soviet corn imports from all sources are projected to rise another 2 million tons this year, despite a larger Soviet crop. China is back in the corn import market, its position as a major corn exporter having diminished considerably since 1985/86.

South Korea will remain one of the strongest growth markets for coarse grains, corn particularly. Meanwhile, the European Community's (EC's) corn imports from suppliers outside the EC will continue to fall.

Healthy world demand notwithstanding, prices are likely to be down from last season's drought levels. Our forecasts call for a 49-percent increase in U.S. coarse grain production and a 1-percent increase in foreign production. At this point, it appears that lower prices will offset the higher export volume, resulting in a decline of up to 10 percent in the value for U.S. coarse grain exports.

Turning to **wheat**, world trade volume is likely to be steady to down slightly. With stagnant demand, U.S. wheat exports may drop about 4-3/4 million tons, as Canadian and Argentine exports rise. For the second straight year, the EC is expected to be our largest export competitor.

With the U.S. wheat crop up an estimated 13 percent and foreign output up 5 to 6 percent, we're looking at record world production. Among major markets, significant production increases are expected in India, China, and the USSR. Among competitors, sharp output increases are projected for Canada, Argentina, and the EC. Larger Soviet production is expected to result in total wheat imports of only 12 million tons, the lowest purchase volume since 1979/80.

A further drawdown in U.S. and world stocks during the current crop year will give some support to wheat prices in 1990. Nevertheless, lower U.S. sales volume is expected to trim the value of our wheat exports by around 14 percent from fiscal 1989's \$6.3 billion.

For **oilseeds**, a very large Southern Hemisphere soybean crop is likely to limit exports of U.S. soybeans and soymeal. We'll see a recovery in the Argentine soybean crop after last year's drought and another good crop in Brazil. U.S. soybean exports may rise about 11 percent in volume, but South American producers will record a bigger increase.

U.S. soybean production is up about 25 percent, and foreign production is up a forecast 4 percent. The recovery in production and stocks will likely mean sharply lower prices compared with last season -- and the lower prices will bring down the value of U.S. soybean exports, even as sales volume expands. Overall, U.S. oilseed exports may decline more than a billion dollars from 1989's \$6.8 billion, based on current prospects.

The outlook for **cotton** exports is very encouraging. Our November projections suggest that U.S. export volume may rise 10-15% in fiscal 1990, despite the much smaller U.S. harvest compared with last year. At the same time, foreign export volume will decline. As a result, the U.S. share of world cotton exports during the marketing year could jump to 31 percent, well above last season's 24-percent share. Prices will be held up by the tight global supply-demand balance, meaning a very sharp increase in U.S. export value in fiscal 1990.

However, competition will heighten considerably next spring, as Southern Hemisphere producers harvest larger cotton crops to take advantage of the strong market.

In the **high-value** category, U.S. livestock, dairy, and poultry exports are expected to match last year's record \$6.6 billion. Increased beef exports to Japan take much of the credit. Likewise, horticultural product exports are projected at a record \$4.4 billion, bolstered by larger sales of fruits, vegetables, tree nuts, and wine to the Pacific Rim nations.

Even with several successive records, the United States continues to lag well behind the European Community in exports of high-value and consumer-ready products. The United States accounts for a third of world trade in bulk agricultural products, but our share is less than 10 percent for consumer-ready foods and beverages.

Outlook for Major Markets

Let me say just a few words about our forecasts for major markets.

The **USSR** is the world's largest importer of grains. The U.S. share of total Soviet grain imports -- at 18 percent just 3 years ago -- was close to 60

percent in 1988/89. As bilateral relations have improved, the Soviets have turned to the United States for a larger proportion of their imports.

U.S. agricultural exports to the Soviet Union reached an all-time high in fiscal 1989 -- \$3.3 billion. This made the USSR our second largest single-country market after Japan. In 1990, we may nearly match this sales level. A decline in the export value of U.S. grains and oilseeds will probably be balanced by record U.S. sales of meat and dairy products.

Large imports reflect the Soviet government's commitment, as part of its reform program, to meet consumer demands for improved food quality, variety, and availability. Grains are needed to sustain large livestock herds, so meat and dairy supplies can be increased. Although wheat imports will be down in 1990, the USSR is expected to account for 24 percent of total world coarse grain imports in 1990. U.S. corn exports will probably equal last year's record volume of 16.3 million tons.

Our current long-term grain agreement with the USSR was originally set to expire in 1988. Last year, both countries agreed to extend it for an additional 27 months, until the end of 1990. Bilateral talks aimed at a new long-term agreement for 1991-1995 are scheduled to begin next week in Moscow.

A few other country forecasts may interest you --

- o After more than doubling in fiscal 1989, U.S. agricultural exports to **China** may decline to perhaps \$1.2 billion -- still the second-largest U.S. sales figure to China in more than a decade.

- o **Japan**, our largest market, is expected to hold fairly steady this year, with U.S. agricultural export value forecast at around \$8.2 billion. U.S. beef exports, which rose nearly 60 percent in fiscal 1989, are expected to continue expanding in line with the terms of the beef-citrus agreement. U.S. pork and poultry exports are also likely to grow.

- o U.S. exports to **South Korea** are projected to increase for the fourth straight year in 1990, perhaps reaching a record \$2.5 billion. Beef is one of our fastest growing exports to this country, rising nearly 600 percent in 1989 as Korea began to open up its market to beef.

- o Our exports to the **European Community** are likely to decline by a half-billion dollars this year. Some of that decline is the result of reduced opportunities for meat sales because of the EC hormone ban. This issue has not yet been resolved to our satisfaction.

- o In the year that just ended, U.S. agricultural exports to **Eastern Europe** slumped to their lowest level in a decade--\$422 million. We expect to see a moderate increase this year. Much of it will be in food assistance to Poland under P.L. 480 and other concessional programs. Commodities include corn, sorghum, rice, butter, soybean oil, pork bellies, and cotton.

Some of you may remember that U.S. agricultural exports to Eastern Europe exceeded \$2 billion back in the early 1980's, when large amounts of credit

were extended. Debt and lack of hard-currency earnings are now a barrier to trade, but the latent demand is still there.

Later this evening, I'll be boarding a flight to Poland as part of a government-private sector team led by Secretary Yeutter. Our mission is to provide the President with recommendations as to the most effective use of U.S. assistance to Poland, and to assist the Poles in developing their own economic restructuring program.

Looking Ahead to the 1990's

I said, at the beginning of this presentation, that the 1990's hold much promise for export growth.

We are witnessing dramatic reforms sweeping across the Soviet Union and Eastern Europe. In the less developed countries, rapid population growth should translate into growing demand for food, if their economies can improve.

In 1979, Asia replaced Western Europe as the leading regional market for U.S. agricultural products. Since then, the percentage of U.S. farm exports going to Asia has steadily increased -- from 32 percent in fiscal 1980 to 41 percent in 1989. Asia will continue to be a growth market -- especially for high-value, consumer-ready products -- as industrialization proceeds and income continues to rise.

However, we all learned a valuable lesson in the 1980's: We cannot assume that export growth is inevitable.

In my judgment, the greatest potential obstacle to expansion in agricultural trade is the protectionist policies pursued by governments around the world. I know the importance of trade reform under the GATT was covered in some detail this afternoon, and I won't get into this.

Let me just say that, not long ago, much of the world lived with barriers preventing the free flow of ideas, people, and commerce. We have seen walls being broken open, to one degree or another, in the Soviet Union, China, and now Eastern Europe. It would be a sad irony if the industrialized democracies were unable to dismantle the walls they have erected -- walls to the free flow of food and fiber products, based on comparative advantage.

For many developing countries, debt remains a major constraint on imports. They, too, need access to the markets of the industrialized nations, so they can increase their export earnings. The best strategy to increase the future potential for U.S. agricultural exports is to encourage and promote policies that foster rising incomes in the developing countries. These are the growth markets for farm products, the markets where diets are improving and will continue to improve as incomes increase.

Free and open markets, and assistance for economic and agricultural development, is a sound investment in the long-term growth of the foreign markets on which U.S. agriculture is so dependent.

From the U.S. perspective, I must say that all signs point to a very challenging trade environment in the 1990's. We took some major steps to re-establish our competitiveness with the 1985 farm bill, but we need to remain vigilant to ensure that U.S. agriculture can compete in the years ahead.

To sell at competitive prices, we have to keep our production costs down. Fertile soil and a generally favorable climate account for only part of our comparative advantage. Much more rests on the investments we have made in agricultural research and development over the past half century. These investments have given American agriculture one of the fastest productivity growth rates of any sector of the U.S. economy.

A nation that does not maintain its investment in research and science is gambling with its future and its competitive position. Modern U.S. agriculture is a high-tech industry, an industry that requires a constant infusion of new ideas and technologies to maintain its edge.

Conclusion

To briefly recap the export outlook for 1990, we are expecting U.S. agricultural exports this fiscal year to total around \$38 billion, down about \$1.7 billion from 1989. Export volume should remain close to the 1989 level -- within about 2 million tons.

Clearly, we haven't yet recovered to the 1980-81 peaks in export volume and value. On the other hand, we're starting the new decade in a far better position than we were in the mid-1980's, at the bottom of our export slump.

In short, export prospects are fraught with uncertainties as well as opportunities. As the bearer of this mixed message, I am reminded of an old New Yorker cartoon. A messenger had just delivered news from the battle front to the king. The king's guards were wondering whether they should drag the messenger outside and execute him.

"The news was neither good nor bad," said the King. "Just take him out and rough him up a little."

Thank you for treating this messenger more courteously.

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FOOD GRAIN OUTLOOK

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Analysis of the United States and world wheat markets will be especially challenging in the months ahead. U.S. and world wheat stocks are the lowest in years--the large cushion of only two to three years ago has been cut dramatically. Reacting to market signals, world wheat production in 1990 may be headed for a second consecutive record. World import demand is expected to continue to expand next year, if only modestly. World wheat stocks are likely to increase.

But, keep in mind any major deviation in production from trend expectations or a shift in import policy, particularly for the USSR, could cause total world wheat trade to change dramatically. With world wheat stocks at their lowest level in years, any significant upturn in import demand could push wheat prices sharply above current expectations.

A number of questions immediately come to mind. Will other exporting countries react to another year of high prices and expand wheat area for 1990/91. What decisions will major importers such as China, Egypt, and Brazil and others make on import policy; will they choose to meet increasing consumption with imports or by expanding domestic production.

Is the world facing a turning point by embarking on another era of stock building? For 3 years, supplies have been relatively tight and the world has been drawing on stocks to help meet annual consumption needs. World wheat stocks at the end of the 1989/90 marketing year are expected to fall to their lowest level since 1981/82. In order to put current global stock levels in better perspective one must compare them with demand. The last time stocks were this low, world wheat utilization was averaging less than 450 million tons. In contrast, world wheat use in 1989/90 will total around 530 million tons. The stocks-to-use ratio, an often used indicator of the relative abundance or scarcity of supplies, is expected to fall to around 20 percent at the end of the 1989/90 marketing year, its lowest level in more than 30 years.

OUTLOOK FOR 1990/91

After 4 consecutive years of decline, world wheat area turned up in 1989. Most of this increase took place in the major exporters as their producers reacted to strong prices, and in the case of the U.S. less restrictive land set-aside programs. Wheat area will very likely increase again for the 1990 crop, the only question is how much? The current marketing year promises to be another year of good returns to wheat producers. The U.S. has announced program

provisions which will require that very little wheat area be held out of production for 1990. These factors almost guarantee a larger U.S. wheat area for 1990. Area could also show some modest increase in the major competitors as they react to another year of good prices and strong demand. In fact, based on past experience, area could expand in both exporting and importing countries as they react to a 2-year period of strong prices.

Given the low world wheat stocks, policymakers, consumers, farmers, and commodity analyst will be following the development of the 1990 world wheat crop with intense interest. If area devoted to wheat world wide should expand and yields stay on trend the world could easily harvest a 1990 crop of around 545 million tons. This would be a second consecutive record crop. This has happened only twice before in the past 3 decades.

Since the mid-1970's, world wheat consumption for food has been increasing at around 3 percent annually. During this period, wheat became a more important feed ingredient. However, more plentiful supplies of coarse grains the past 2 years, and reduced supplies of feed quality wheat have limited wheat feed consumption. Even with prospects for another large wheat harvest in 1990/91, wheat prices are likely to be significantly above prices of corn and other feed ingredients thus limiting the amount of global wheat feeding.

If food use of wheat continues its expansion of recent years in 1990/91, total world wheat utilization would total around 540 million tons. For the first time in 4 years, world wheat production is likely to exceed consumption, resulting in some rebuilding of wheat stocks.

Any analysis of world wheat trade in 1990/91 is faced with more than the usual uncertainty. Will countries such as India take advantage of likely lower world wheat prices to rebuild depleted stocks? Will Chinese wheat imports resume their upward climb following 2 years of relative stability? Will the USSR's reported intentions to reduce dependence on imported wheat result in a further reduction in their imports? These are but a few of the trade related questions that are currently being discussed.

At this time, world wheat trade for 1990/91 is expected to expand modestly from this year's level. Competition to capture this increase in demand will be more intense than in recent years. Wheat supplies in virtually of the major exporters could be larger. Pressure to export in order to maintain returns to producers will be great. Experience has shown that most exporters faced with the option of additional exports or holding stocks normally opt for more exports. In the past, the United States has almost unilaterally taken on the responsibility of withholding excess supplies from the market.

DOMESTIC SITUATION AND OUTLOOK

U.S. wheat supplies in 1989/90, at 2.76 billion bushels, are down 11 percent from a year earlier, and 31 percent below the record high supplies in 1986/87. Production is up over 230 million bushels from 1988/89, but the drop in carryin stocks is more than twice as large as the production gain. The supply can cover forecast demand, but only if stocks are drawn down again.

U.S. wheat production is estimated at 2,042 million bushels, up 13 percent from last year, but less than any other year this decade. Area planted increased 17 percent, but above average abandonment and lower yields resulted in smaller production than earlier expected.

Planted area increased because of fewer acres idled under annual programs. Producers who participate in the Acreage Reduction Program (ARP) were required to idle only 10 percent of their wheat base acres instead of the 27.5 percent a year earlier. Also contributing to higher planted area was lower program participation (78 percent versus 86 percent in 1988/89). Further encouraging plantings were attractive prices, above \$4 per bushel at most major markets during planting. However, part of the expansion was due to the replanting of fields that had suffered extensive winterkill. Total wheat yields are estimated at 32.9 bushels per harvested acre, down 4 percent from last year's poor yields and 13 percent below the 1983-87 average.

U.S. wheat exports in 1989/90 are projected to be 1,275 million bushels, 10 percent below 1988/89. World market share is expected to fall from 39 percent in 1988/89 to 36 percent in 1989/90. A significant decline in USSR import demand, higher exportable supplies in Canada and Argentina and tight U.S. supplies will limit exports in 1989/90.

Total use of U.S. wheat in 1989/90 is projected to decline for the second year in a row, dropping 14 percent from the 1987/88 record. At 2,317 million bushels, use would be the third smallest during the 1980's, but larger than any year before 1980/81.

Wheat stocks on May 31, 1990, are forecast at only 443 million bushels, down 37 percent from 1989, and less than one-fourth the 1985/86 record. The FOR is estimated at 150 million bushels. CCC inventory is forecast at only 100 million bushels, the lowest since 1978/79. Food aid and other Government programs are gradually reducing CCC inventory.

Prices received by farmers are forecast to range from \$3.85 - \$4.00 per bushel, the highest since the record \$4.09 in 1974/75. The forecast ending-stocks-to-use ratio of 19 percent would be the lowest since 1973/74, and might be expected to generate higher prices. However, uncertainty about the level of import demand, particularly USSR imports, and some slacken in foreign wheat purchases after the early season surge, has done little to stimulate wheat prices. In addition, free stocks at the end of the 1989/90 marketing year will not be significantly below the year-earlier level, and a large 1990 crop is expected.

NEXT YEAR'S U.S. OUTLOOK

Reflecting a lower ARP and expected strong prices during the fall and spring planting season, planted area for the 1990 wheat crop is expected to increase by about 5 percent to around 80 million acres. If yields rebound to near the 1983-87 average, the 1990 harvest could total close to 2.6 billion bushels, the largest since 1984. However, total wheat supplies will be only about 10 percent above the 1989/90 level as stockpiles have been dramatically reduced. Given some increase in supplies next year and likely lower prices, domestic use of wheat should increase. Food use should continue the recent upward trend. As

noted earlier, world wheat trade is expected to increase only modestly in 1990/91. The United States could well face increased competition in the export market if the major exporters expand wheat area as expected. However, the United States is expected to capture at least some of the projected increase in world trade. Increased domestic use and higher exports will not be sufficient to absorb the 1989 crop, so 1989/90 will be a year of stock building. Prospects for only a limited growth in demand and some rebuilding of some stocks in 1990/91 will likely result in wheat prices to farmers averaging below the level of the 2 preceding years.

THE COMPETITION

In order to better understand the competitive environment that the U.S. will be operating in next year, let's take a moment and look at our major competitors.

Attractive returns from the production of coarse grains and oilseeds had contributed to a steady decline in Argentine wheat area during most of the 1980's. Reacting to sharply higher wheat prices, Argentina's producers increased wheat area for the 1989 crop. Wheat area next year should hold in the area of 6 million hectares as competition from other crops limit any further expansion. Much will also depend on government policies. Export taxes on agricultural commodities still exist, although the government has been reducing them. Macroeconomic conditions will also play an important role in Argentine farmers' decisions. Credit availability, interest rates, exchange rates, and the general level of confidence in the existing Government can all work together to encourage or discourage production. Of course, weather at planting remains a significant factor. A significant portion of Argentina's annual exportable supplies are committed under various grain trading agreements. Latin America has become a more important market for Argentina wheat in recent years, with much of the expansion coming at the expense of the United States. As Argentina's exportable supplies are not expected to increase significantly in the years ahead, their annual share of the world wheat import market could decline.

Australian wheat production is concentrated in the so-called "wheat-sheep" zone where wheat competes for farm resources with wool and beef production. As long as the outlook is good for Australian beef and wool prices, wheat area is not expected to change appreciably. Total wheat area is likely to continue in the 9-10 million hectare range. Australia has been expanding its feedlot operations, increasing domestic demand for feed. However, this year's wheat shortfall may keep domestic wheat prices high relative to those of barley, minimizing any potential area shifts to feed grains. The choice between wheat and barley may depend more on the weather at planting. It is unlikely that Australia will be able to duplicate the high export levels of the mid-1980's as long as wheat stocks are minimal and area doesn't expand. A significant portion of Australia's annual wheat exports are also covered by various trading arrangements.

Attractive returns from wheat relative to other grains prompted an expansion in Canadian wheat area in 1989 following 2 years of decline. Weather permitting, wheat area in 1990 could approach the 1986 record of slightly more than 14 million hectares. Wheat land in Canada has few production alternatives, although under certain conditions, producers may expand their barley and

rapeseed/canola area at the expense of wheat. Canada could see a significant increase in wheat production and export availability in 1990/91 if yields were to increase from the weather impacted levels of the past 2 years. Canada will continue to be the major competition for U.S. wheat in the world's durum and high quality milling wheat markets.

Recent developments in the EC have to be a concern to the United States as the world's major wheat exporter. Despite the introduction of a multi-year land set-aside program, wheat area in the EC is expected to show little decline over the next several years. Compounding the problem, recent EC program decisions are expected to encourage the production of high yielding winter wheats. The yield effect alone could result in a significant increase in EC wheat production over the next 5 to 6 years.

There appears to be only limited opportunities to expand domestic consumption to absorb these additional supplies. Recent policy changes indicate that the EC is going to continue to limit the amount of wheat moving into intervention stocks. The private sector in the EC has never been a large holder of wheat stocks. Consequently, it appears that there will be intense pressure within the EC to move the bulk of this wheat onto the export market.

The size of the EC's exportable supplies of wheat and its internal policies continue to be major factors affecting global trade. In recent years, the EC has been cutting market and intervention (support) prices, contrary to an expected response of lowering production, these policies may have caused farmers to increase production to maintain their total revenue. Additionally, by diminishing the appeal of intervention stockholding to farmers, the EC has effectively shifted its primary market support mechanism from intervention stocks accumulation to export disposal. As long as the EC is willing and able to sustain a heavily subsidized export program, farmers will have a ready outlet for their surplus production.

This year, the EC had its next to largest wheat harvest--over 79 MMT, or 4.6 MMT bigger than the 1988 crop--average yields were actually below trend! With that large crop, stagnating domestic use, and a policy to draw down stocks, exports in 1989/90 are expected to again reach last year's record 21 MMT.

And the outlook for 1990/91 is no brighter! Winter wheat seedings of high yielding varieties have expanded this fall. So with normal weather another bumper harvest can be expected in 1990. If that happens, we might even expect another record EC wheat export program for 1990/91.

GATT NEGOTIATIONS IMPORTANT TO U.S. WHEAT INDUSTRY

Overhanging the whole commodity trade outlook is the upcoming GATT negotiations. GATT will be covered in detail in other sessions so I won't go into any details here. But just keep in mind that trade liberalization will have a significant impact on the U.S. grain sector. Most of us feel that a more open world market and level playing field will benefit the U.S. wheat industry.

A LOOK BACK

During the 1987 Outlook Conference, it was pointed out that, with a new farm bill in place, prospective lower world wheat prices should go far in stimulating import demand. I believe that early in the period covered by the Food Security Act of 1985 (FSA) importers did react to lower prices. As was pointed out 3 years ago, there is ample evidence that in time of rising prices, world wheat utilization falls below long term trends and vice versa, during periods of falling prices consumption normally runs above trend. At that time, we speculated that with world wheat prices likely to be down 20-30 percent, a buyer's dollar goes further, therefore some expansion in wheat utilization and imports was likely. This pickup in demand was expected to represent a permanent increase in trade as countries reached new levels of wheat consumption.

THE 1990 WHEAT PROGRAM AND MODIFIED CONTRACTS.

The 1990 wheat program announced last May provided for a reduction in the target price from \$4.10 per bushel to \$4.00 and a reduction in the loan rate from \$2.06 to \$1.95. The acreage reduction program (ARP) level was reduced from 10 percent to 5 percent.

In September, following projections of a further tightening of stocks in the United States and abroad, the Secretary announced that producers would have the option of signing a modified 1990 wheat program contract. If they choose the modified contract option, producers can plant up to 105 percent of their wheat base. Targeted prices and loan rates do not change, but for each acre planted beyond 95 percent of their base, producers give up one acre's worth of deficiency payments. Producers signing modified contracts do not have to idle a portion of their base acres. They cannot, however, build future wheat base by increasing their plantings under modified contracts.

Compared with the original contract announced last May, the modified contract is estimated to result in an additional harvested area of 2.1 million acres or around 70 million bushels of potential additional production. Even if wheat prices are slightly below the levels they would have been without modified contracts, a combination of factors should generally maintain or increase a farmers' income from wheat under modified contracts. First, all program participants continue to have deficiency payment protection. Producers with regular contracts have full deficiency protection. Producers with modified contracts have most of the deficiency protection. For example, producers at the maximum 105 percent production level still have 85 percent of their deficiency price protection.

Second, participants with modified contracts will have more wheat to sell. The increase in the quantity of wheat to market should more than offset any small decline in price caused by modified contracts.

Third, for production on up to 100 percent of base level, producers do not give up returns from alternative crops; they only give up idled ACR acres that produce no income. Between the 100 and 105 percent level, some producers will have to forego returns from alternative crops to plant wheat.

Finally, USDA can take steps to counteract any downward price pressures that may occur. At normal yields, 1990 production would increase by about 70 million bushels above output that was expected with the 1990 program announced last May. We would expect that some of the increase will be exported and some will be added to stocks. Should we have a bumper crop, we can alleviate stock and price pressures by rebuilding the Food Security Reserve and by aggressively using the Export Enhancement Program. Should we have poor weather again next year, we will have slightly higher supplies to meet our customers' needs.

We expect that modified contracts will increase participation by as much as 10 percent over original projections. Producers who otherwise would have stayed out of the program and planted up to 105 percent of their base can now be in the program and collect deficiency payments with no change in their production plans. Although this feature increases current year program costs, the increased participation reduces the amount of base building for future years by non-participants.

THE CONSERVATION RESERVE PROGRAM AND WHEAT

Over 30.6 million acres of all cropland has been contracted into the Conservation Reserve Program (CRP) since its inception. These CRP acres represent approximately 8 percent of all cropland used for crops before the CRP. Another 4.2 million acres have been offered by producers for enrollment in the CRP and USDA will announce shortly how many of these acres will be contracted.

If producers enrolling land in the CRP have base acres for any annual program crop, they must retire a percentage of their base acres. The percentage is equal to the ratio of acres enrolled in the CRP to total crop acres on the farm. If producers have more than one type of base acre on their farm, they can choose which base or combination of bases to retire. To date, producers have contracted to retire over 9.1 million acres of wheat base. These acres represent approximately 10 percent of all wheat base. The main impact of the CRP, on wheat production likely has been through this reduction of base acres.

Impact of the CRP on future wheat production will depend on the the number and location of additional acres enrolled in the CRP and the nature of annual commodity programs under the 1990 farm bill. More flexible types of commodity programs that weaken the link between planting decisions and historical base acres could reduce the impact of the CRP on wheat production.

WHEAT ISSUES FOR THE 1990 FARM BILL

Stocks Policy. What levels of wheat stocks should the U.S. carry? Who should pay for holding stocks and who should control their flow into the market? Should stock levels fluctuate or be relatively constant? Decisions on stocks affect a wide range of commodity program components, for example: Acreage Reduction Programs, the Farmer-Owned-Reserve, the Export Enhancement Program, and P.L. 480.

When the Food Security Act (FSA) of 1985 was being debated, the focus was primarily on how to reduce stocks. U.S. wheat stocks were large--ending stocks for 1985/86 equaled 97 percent of total wheat use during the year. Programs implemented under the FSA and two consecutive years of drought have sharply reduced stocks.

Many view the lower stock levels and accompanying higher prices as one of the "success stories" of the FSA and advocate keeping stocks relatively low and prices strong to minimize government payments and government ownership or control of stocks. Others see a need for a stocks policy that explicitly considers the potential costs and benefits of having enough stocks to minimize price shocks to the U.S. food and livestock sectors and to guarantee that the U.S. continues to be a reliable supplier in world markets.

Decisions as to appropriate stock levels and stock policies are not clear cut; any stocks policy has both gainers and losers. A policy that promotes lower U.S. wheat stocks likely would lead to higher and more volatile U.S. wheat prices. Government program costs would be reduced and stockholding by the private sector as well as other countries would be encouraged. World wheat prices would likely be higher on average and U.S. exports lower because U.S. stocks would no longer be available to meet production shortfalls and buffer price increases.

A policy that promotes higher U.S. wheat stocks likely would lead to lower U.S. wheat prices and less volatility. Lower wheat prices would make the U.S. more competitive in world markets. Importers would view the U.S. as a more reliable supplier because U.S. stocks would be available to buffer production shortfalls.

FARMER OWNED RESERVE. If government policy is to encourage stockholding, is the Farmer Owned Reserve (FOR) the best way to do so? The FOR was designed to maintain a certain minimum level of stocks as a buffer against production shortfalls, to allow farmers to retain ownership of these stocks, and to decrease price volatility by isolating temporary surpluses. As originally implemented, wheat entered into the FOR could not be withdrawn without penalty during the contract term unless market prices reached a "release" level. If market prices reached a higher "call" level, the government would encourage redemption of FOR loans. At its simplest, when free stocks were high, entering wheat into the FOR would isolate it from the market and raise prices; when free stocks became tight, releasing wheat from the FOR would make more wheat available to the market and would lower prices.

At its peak, 1.1 billion bushels of wheat were in the FOR. FOR wheat stocks have steadily declined in recent years. As additional FOR loans mature, levels are expected to decline to 150 million bushels by June 1990. All wheat is expected to be liquidated from the FOR by January, 1991.

Current law specifies that the Secretary shall encourage new entry of wheat if FOR levels fall below 300 million bushels and wheat prices are below 140 percent of the loan rate. Current wheat prices are above the 140 percent level, and new entry of wheat into the FOR is not expected to occur in the near future.

The FOR has evolved from its original operation. Because producers can redeem FOR loans at any time with certificates at the posted county price, the grain is no longer isolated from the market until market prices reach the release level. The call price has been eliminated.

Would extending regular CCC loans accomplish stock policy objectives in a simpler and more direct fashion than the FOR? If not, would modifications such as lower release prices or adopting provisions that would force grain out of the reserve when stocks were low improve the FOR's performance?

PLANTING FLEXIBILITY. Wheat programs under the 1985 Food Security Act have used historical plantings as a basis for program participation and for acreage reduction levels. Except for the 0-92 program, the programs also have linked deficiency payments to the number of wheat acres planted after meeting the acreage reduction requirement. Until 1990, all producers had to idle the same proportion of wheat base and received the same level of deficiency payments. Modified contracts for 1990 allow producers to choose--within certain limits--the number of base acres they will plant. Each level of planted acres has a different level of deficiency payment acreage associated with it.

Modified contracts represent a limited type of planting flexibility. They illustrate that program production and payments can be separated--either partially, as in this example, or fully, as for some decoupling proposals that have been advocated. Policy makers will be watching participation in modified contracts very closely to see if the option is popular with producers.

Proposals to increase planting flexibility may retain the framework of historical base acres or may move toward a current plantings concept. Under a current plantings concept, producers do not need a history of planting wheat to participate in the wheat program. They only need to meet any set-aside requirement by idling land equal to a percentage of the acres they have planted. If a current plantings procedure were adopted, policymakers would still need to decide whether to base payments on historical or current plantings.

Planting flexibility can encompass a variety of ways to determine who can plant and who will receive payments. Producers seem to like the idea of having more flexibility to plant other crops, but not the flexibility for others to start growing the crops that they grow.

TARGET PRICES AND REALIGNMENT. Wheat target prices declined by 8 percent from the 1986 to the 1990 programs. These levels combined with other program provisions cause returns to wheat planting under the program to be somewhat high relative to returns from some other commodities.

If the 1990 farm bill uses current plantings or similar flexible provisions as the basis for program production and payments, target prices may need to be realigned so that relative returns are more equal. Without realignment and constraints imposed by wheat base acres, a relatively high wheat target price would encourage more wheat plantings at the expense of other crops. Budget exposure as well as outlays could increase substantially.

While realignment can occur by raising target prices for crops with lower targets, budget considerations probably point to realignment by reducing target prices for crops with higher targets.

NON-TRADITIONAL ISSUES.

Stocks and other supply management policies are traditional issues. Soil erosion and conservation became major commodity program issues with the FSA of 1985. The two main conservation programs established by the FSA are the Conservation Reserve and conservation compliance.

Under conservation compliance, farmers who produce crops on highly erodible land must have a conservation plan approved for their farm by January 1, 1990 and the plan must fully implement the plan by January 1, 1995, or producers will lose eligibility for USDA program benefits. Farmers who do not meet the January 1, 1990 deadline for developing a conservation plan must also implement any plan they later develop before they can regain eligibility for program benefits. As of July 19, plans had been developed for 89 percent of the estimated acres affected by conservation compliance.

The 1990 farm bill may very well address environmental issues beyond soil erosion--especially water quality. Sediment entering streams from insufficiently protected cropland affects recreation, water treatment, water storage, irrigation, navigation, and flooding. Fertilizer or pesticides may infiltrate ground water or be carried into streams and impair water use. Crop production practices and input use are areas that will probably be addressed in future farm bills if not the 1990 farm bill.

RICE - WORLD SUPPLY AND TRADE

World rice production in 1989/90 is forecast at a record 331 MMT (milled basis), up about 1 percent from last year. However despite the large crop, consumption is still expected to exceed production. Strong import demand will likely boost calendar 1989 trade to a forecast record 14.5 MMT, 1.4 MMT more than the previous high in 1981. China, India, and Indonesia fueled trade in the first half of the year. While the general export pace has begun to slow, it is likely to pick up again late in the year when Thailand's main-season crop begins to be harvested and prices generally decline.

The biggest surprise of 1989 has been the record export volume in both Thailand and Vietnam. In 1989, expansion in Vietnamese rice production has allowed that country to export a forecast 1.3 million tons. This volume far surpasses Vietnam's 5 year average and is nearly 4 times more than Vietnam's previous record set in the early 1960's. The primary buyers have been in Sub-Saharan Africa, particularly the Ivory Coast and Guinea, and in Asia, including China, India, and the Philippines. New agricultural policies instituted in 1988 apparently have been a major impetus to production and export growth. The government now allows individuals and their families to lease land for 10 to 20 years. This may give farmers enough security to make investments in land improvements necessary to increase production. In addition, farmers can now market their own grain rather than sell it to the government. The system of input distribution has also changed, allowing inputs to be distributed by provincial rather than central authorities, allowing private market purchases for those who can afford it, and permitting private ownership of equipment and draft animals.

Thailand is expected to export a record 5.9 MMT in calendar 1989. Large crops in 1988/89 and 1989/90 is allowing exports to expand in response to strong demand, but recent domestic policy developments have also benefited Thailand's rice sector. Government policy has changed from taxing rice exports to supporting rice production and exports. Until 1986, export taxes for Thailand's rice somewhat limited exports. Since the last of these taxes was removed in early 1986, there has been little government involvement in Thai

rice markets relative to those of other countries. Price transmission from world markets to producers is now largely unencumbered by government measures. In response, production and exports have reached record levels, solidifying Thailand's position as the world's leading rice exporter.

World rice trade in CY 1990 is forecast at 13.4 million tons, down significantly from the record trade level in 1989, but still the second highest level ever. Increased expected demand in South America and West Africa will be more than offset by a substantial decline in China's record imports from 1989 and reduced imports by Mexico, India and Indonesia.

U.S. RICE OUTLOOK FOR 1989/90

U.S. rice production in 1989/90 is forecast at 156 million cwt, down 2 percent from last year. All of the decrease can be attributed to a projected 6-percent drop in long grain production. Combined medium and short grain production is projected to rise 10 percent.

Lower overall output is the result of the 5-percent decrease in harvested acreage from 1988/89, to 2.75 million acres. Long grain acreage is projected down 7 percent, while combined medium and short grain acreage in forecast up 3 percent.

The decrease in long grain acreage can likely be attributed to several factors. These include: slightly lower prices before planting compared with a year earlier, a 3-percent lower target price and a 2-percent lower loan rate; increased participation in the 50/92 program; reduced nonprogram acreage; and substitution of soybeans for rice on rice base, allowed for the first time this year.

Overall yields are projected to reach a record 5,697 pounds per acre in 1989/90, up 186 pounds from last year and an increase of 46 pounds from the previous record 1986/87 crop. Long grain yields are projected to rise 2 percent, and combined medium and short grain yields are forecast to increase 7 percent from last year's reduced level.

Favorable weather helped improve yields this year in Arkansas, Mississippi and California. Arkansas yields are forecast at a record 5,600 pounds per acre, Mississippi yields are forecast at a record 5,500 pounds, and California yields are forecast at a record 7,900 pounds. Excessive rainfall in Texas and Louisiana during the critical heading stage kept their yields down. Missouri yields are forecast down slightly.

U.S. rice exports are forecast down 8 percent, to 79 million cwt, because of an expected reduction in world imports. U.S. farm prices may rise, reflecting tighter supplies than in 1988/89. However, U.S. export prices are expected to remain competitive in the world market.

Domestic and residual use will likely rise 3 percent, not quite offsetting the decline in exports. Domestic use continues to grow steadily because of population increases and larger per capita consumption.

For the fourth consecutive year, U.S. production is expected to fall short of use. As a result, stocks may slip to 24 million cwt by the end of the 1989/90 marketing year, down 11 percent from a year earlier and the lowest level since 1980/81.

U.S. prices have weakened in recent weeks in response to greater domestic supply availability, larger foreign-competitor supplies, and a decline in world import demand. U.S. farm prices are forecast to range from \$6.00 to \$8.00 per cwt in 1989/90, compared with \$6.50 to \$7.00 in 1988/89 and \$7.27 in 1987/88.



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THE FEED GRAIN OUTLOOK FOR 1989/90

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The feed grain supply for 1989/90 is forecast to total 290 million metric tons, 2 percent above 1988/89. Last year, beginning stocks were large but severe drought over the Corn Belt, Northern Plains and Lake States reduced production sharply. In contrast, this year's beginning stocks are less than half of year-earlier levels but a rebound in yields and nearly 13 percent more acres harvested is more than offsetting. Gains in production of corn and oats are resulting in increases in supply of 4 percent and 31 percent, respectively. However, increases in production of barley and sorghum this year fell short of covering the drawdown in stocks during 1988/89 and supply is down 2 percent for barley and 14 percent for sorghum.

The livestock and poultry industries also will be interested in the supply of total feed concentrates, which is forecast to rise about 4 percent this year. Other energy concentrate feeds are expected to be down slightly but protein feeds, largely soybean meal, are forecast to rise nearly 4 percent. The supply of concentrates represents what is forecast to be available in the market. However, the amount used by the livestock and poultry sectors also depends on demands arising from domestic processing industries and from users abroad.

The domestic food, seed and industrial (FSI) use is forecast up 2 percent to 38.3 million metric tons. FSI use of corn is expected to total 1,275 million bushels, up 30 million from last year. The wet milling industry may use nearly 4 percent more corn in the production of sweeteners and ethanol and the dry milling industry about 2 percent more as some closed ethanol plants may reopen to use lower cost corn. Oats used by the processing industry is expected to rise about 10 percent in 1989/90 as the market for oat bran products continues to expand. FSI use of barley is expected to be about the same as the 180 million bushels used last year but sorghum use in processing is forecast to drop about 7 million bushels.

FSI use of corn grew rapidly--14.6 percent a year--from 1979/80 through 1984/85 as the markets for corn sweeteners and ethanol expanded rapidly. Since 1984/85, market growth for these products has tapered off and the growth rate of corn used in processing has decreased to 3.6 percent a year.

Oats have been the other feed grain to experience significant growth in processing demand in the 1980's. The introduction of granola products

generated some increase in use of oats. However, the impact of granola was mild compared with the dramatic increase in use of oats resulting from the introduction of oat bran products in 1988. The use of oats in processing increased about two-thirds in the first year of the product introduction. In contrast, FSI use of barley increased about 6 percent total the past 10 years, and sorghum has shown no growth.

Exports of feed grains are forecast at 62.8 million metric tons in 1989/90, 1 percent more than shipped out of the country last year. Corn likely will account for all of the increase with barley exports the same and sorghum exports down about 60 million bushels--1.5 million metric tons. Oats exports are negligible and comprised mostly of processed products.

Exports of corn are forecast at 2,150 million bushels for 1989/90, an increase of 4 percent over 1988/89 shipments of 2,060 million bushels. Large purchases by the Soviet Union, South Korea and several other countries are expected. Russia did not make any purchases in September, but bought about 320 million bushels during the month of October intended for shipment through December. Through November 16, 72.1 million bushels have been shipped leaving about 248 million to ship in a little over 6 weeks, or 41.3 million bushels a week. But the transportation and loading facilities also have to handle the grains and oilseed other importing countries may have scheduled for shipment during this period. In November 1980, 244.7 million bushels of corn and 35.2 million bushels of other coarse grains were shipped, or a rate of 70 million bushels a week.

The shipment picture is complicated somewhat by low water levels and temporary damage to lock and dam 26 that may restrict the quantity of grain that can be barged down the Mississippi. The railroads have extra capacity and can handle increased volume, but at higher cost. The problems on the Mississippi, and the large USSR purchases intended for shipment during the fall have already had an impact on transportation costs, not only on barge rates but on ocean freight rates as well.

Feed and residual use of feed grains in 1989/90 is expected to total about 128 million metric tons, up almost 8 percent from last year's disappearance. Corn is expected to comprise over 70 percent of the increase and oats over 16 percent. Barley and sorghum combined will account for the rest. Total concentrates used in 1989/90 are forecast to increase about 6.5 percent to 180.7 million tons. High-protein feeds would account for about 36.3 million tons, up 5.0 percent from last year. The balance of 144.4 million tons would be energy feeds, with corn at 106.7 million tons and other grains and byproduct energy feeds at 37.7 million tons.

Grain-consuming animal units (GCAU's) are forecast at 77.6 million units, up about 1 percent from 1988/89. A decline in dairy and beef are more than offset by a small increase forecast for hogs and a 5 percent increase forecast for broiler and turkey production. However, in recent years no statistically significant correlation has been evident between GCAU's and feed and residual disappearance of grains.

Feed and residual use of corn is forecast at 4.2 billion bushels for 1989/90, an increase of 250 million bushels from 1988/89. For sorghum it is up 30 million bushels and barley 25 million. Feed and residual disappearance of oats is forecast at 300 million bushels for 1989/90, 100 million more than

last year's disappearance. Most of this increase will be in dairy, meat animal, and poultry use, whereas, most of the feed disappearance last year was by pleasure and thoroughbred horses.

Total forecast use of 229 million metric tons of feed grains in 1989/90 exceeds this years production and ending stocks are forecast down almost 5 million tons. This would be the third consecutive year of decline in stocks and would be the lowest carryout since 1984/85.

Carryout stocks of corn for 1989/90 are forecast at nearly 1.9 billion bushels, slightly less than the 1988/89 carryout. The ending stock-to-use ratio would be 24.9, slightly smaller than the 1988/89 value of 26.6. Based on historical relationships, a stock to use ratio of this magnitude would suggest a season average farm price about 16 cents above loan rate, or about \$1.81 a bushel for 1989/90. However, the bullish price view of farmers generated in the drought year, 1988/89, appears to be carrying into the current marketing year. Farm selling has been light this fall and virtually no harvest price weakness has occurred. In mid-November, the price of corn at Central Illinois elevators was \$2.32 a bushel, 2 cents a bushel higher than the average price in August.

Several factors may account for the slow movement of corn this fall:

- o Farmers have ample on-farm storage.
- o Farmers may expect prices to go higher because they expect large additional purchases by the USSR.
- o Farm income was relatively high in 1989 and farmers are delaying sales until the next tax year.
- o Farmers may be holding corn as a hedge against a drought in 1990.

The season average farm price will depend on the relative strength and mix of these factors, and weather conditions next spring and early summer. If tax reasons are an important factor in slow marketing this fall, sales would be expected to pick up after the first of the year and prices likely would be under pressure. Sales likely will also pick up in late winter as farmers generate cash flow to cover operating expenses for seedbed preparation, planting, and cultivation.

If farmers are holding in expectation of higher prices, they may change their expectations if market needs do not increase. Exports of corn, plus outstanding sales total over 985 million bushels through November 16. To meet the 1989/90 export forecast, additional sales of 1.16 billion bushels will be needed the balance of the year, a lower weekly average rate of new sales than last year.

If weather is a major factor for farmers holding corn, the outcome likely would be evident by early summer. If rainfall and temperature permit normal planting and growth, drought fears will tend to subside in early July and farmers likely will increase selling. Selling pressure will bear heavily on price at this time of the year because market needs are declining seasonally during the summer.

The season average farm price for corn is forecast to fall in the range of \$2.00-\$2.40 a bushel compared with last year's price of \$2.54 a bushel. The upper end of the range represents unfavorable weather next spring and summer and/or greater disappearance and lower stocks than now forecast. The lower

end would result from favorable growing conditions next spring and summer and/or a change in supply and use expectations that would yield larger ending stocks than the current forecast.

Total use of sorghum is forecast at 765 million bushels which would leave ending stocks at 302 million bushels. Sorghum stocks would be tight because about 285 million bushels likely would be in combined CCC and FOR stocks, leaving free stocks of 27 million bushels. However, early harvest of new crop sorghum in Southern Texas will ease the pressure on price. The season average price of sorghum is forecast to fall in the range of \$1.85-\$2.25 a bushel.

Ending stocks of barley next June are forecast at 161 million bushels, down 36 million from this past June. Feed and residual use is forecast to run almost 42 percent of total disappearance in 1989/90, compared with 38 percent last year. Thus, feed barley prices will have a little heavier weight on the national average barley price this year. In addition, the margin between feed and malting barley prices is less than in 1988/89. The farm price of barley is forecast in the range \$2.35-\$2.55. Farm prices averaged \$2.40 for June-October, the first 5 months of the 1989/90 crop year. With ending stocks expected to be tight, adverse growing conditions in the major malting barley producing states would likely cause prices to rise sharply next spring.

Oat prices are forecast at \$1.40-\$1.60 a bushel for 1989/90, down sharply from last year's average farm price of \$2.61. For the June-October period, the first 5 months of the 1989/90 crop year, the average price received by farmers averaged \$1.52 a bushel. The larger supply this year means feed and residual use of oats will have to expand beyond the horse feed market, but this means competition with other feed grains, particularly corn and barley. The market cannot discriminate between buyers so the price will tend to reflect the lowest marginal use, i.e. livestock and poultry feeding.

1990 prospects

It is early to speculate on the 1990 crop but a couple of factors can be pointed out that would suggest a probable increase in the 1990 corn harvest. Enrollment in the feed grain program next spring is expected to be a little less the 80.8 percent of the corn base enrolled this past spring. Also a smaller signup for the 0-92 provision, switching back of soybean acres planted under the 10-25 option, and more of permitted acreage planted may result in plantings of around 75 million acres next year, up from 72.3 planted this year.

Yields also may show improvement in 1990. For the four droughts, 1970, 1974, 1980, and 1983, the yield was always higher the second year after the drought than the first year of recovery. After the drought of 1983, the 1985 yield exceeded the 1984 yield by 10.6 percent, and the average increase from the first to the second year of recovery for the four droughts was 6.7 percent. If this history were repeated next year, the corn yield would be about 124 bushels per acre--but this is not a forecast! The subsoil moisture in the Corn Belt States at the end of October is generally improved over a year ago. However, 1989 is evidence that subsoil moisture can be short and good yields still result if temperature and rainfall in June and July are normal or better.

The World Board will release its first forecast for 1990/91 supply and use, in the May 10, 1990 issue of the World Agricultural Supply and Demand Estimates.

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.



Outlook '90, Session #5

For Release: November 29, 1989

THE OUTLOOK FOR FEED GRAINS AND POLICY IMPLICATIONS

William Lapp
Economic Analyst, ConAgra, Inc.

In discussing the outlook for feed grains today, I would like to briefly review the situation in the United States. My emphasis, though, will be on the world feed grain outlook. Several trends in world feed grain demand are of particular interest, and they will have dramatic implications for U.S. agriculture as we enter the 90's. Finally, I will offer suggestions for modifying agricultural policy in the 1990 Farm Bill which are necessary for U.S. agriculture to take advantage of the positive trends in world feed grain demand.

U.S. Feed Grain Situation

Following the 1988 drought, corn production rebounded sharply in 1989, and continues to be revised upward. Despite less than ideal weather, 1989 corn yields approach trend level. The USDA's September estimate of production was 7.32 billion bushels, but was increased to 7.59 billion bushels in the November estimate. History tells us that further increases are likely, and we should expect the corn crop to total 7.7 billion bushels by the time the final estimate is released.

1989/90 corn usage is expected to total 7.7 billion bushels, up 6% from a year ago and 16% above the level seen prior to the enactment of the 1985 Farm Bill. I expect 1989/90 corn exports to total 2.1 billion bushels, a 70% increase in just four years. This includes sales to the Soviets of over 600 million bushels for the second consecutive year.

With a 1989 crop of 7.7 billion bushels, production will about equal usage, leaving 1989/90 ending stocks of corn unchanged at slightly over 1.9 billion bushels. This is down sharply from the peak of 4.9 billion bushels, but still a fairly comfortable level of stocks-equal to 25% of usage. Following the volatile swings in corn prices during the 1988/89 crop year, corn prices have been fairly stable thus far in 1989/90. Strong Soviet demand for corn has been

offset by the upward revisions in crop size. Producer corn prices are expected to average \$2.25 in 1989/90, down from \$2.54 a year ago. Strong feed demand and additional Soviet purchases could lead to higher prices during 1989/90.

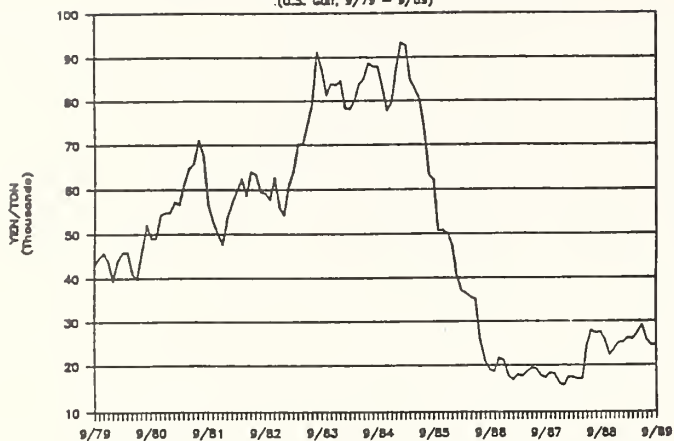
Looking ahead to the 1990/91 crop year, we expect corn acreage to increase by 1.7 million acres to 74 million. While the set-aside requirement has been left at 10%, the increase is expected as a result of increased acreage in the Eastern Corn Belt, as well as soybean acres in the "10-25%" program to shifting back to corn. With normal weather, this translates into a corn crop of around 8 billion bushels.

World Feed Grain Outlook

There are five trends in place today in the world which are particularly striking to me. Each of these trends represents significant opportunities for U.S. grain exports to hit new highs in the next decade. They also represent an opportunity for the farm economy to continue to prosper, if U.S. feed grain production is sufficient to meet demand.

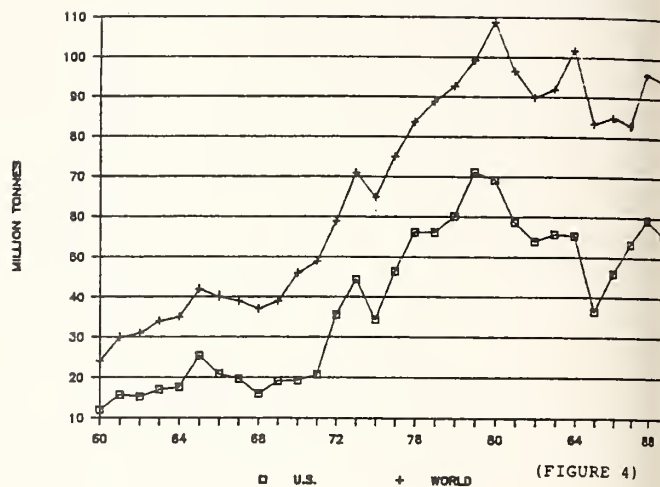
1. The price of corn (FOB New Orleans), expressed in Yen or D-Marks, has fallen sharply since 1985 (figures 1 and 2). Corn prices, expressed in Yen, have fallen to the lowest level in at least 15 years. This is primarily the result of the sharp decline in the value of the dollar. This has not only made the price of U.S. feed grain more attractive for foreign buyers, but also has made competition tougher for foreign exporters of feed grains. The timing and magnitude of benefits for U.S. agriculture from a weak dollar are difficult to measure. Nonetheless, it is certain that a weak dollar, at some point, translates into additional U.S. agricultural exports.
2. After increasing at an annual rate of 2.5% in the 70's, world feed grain usage increased by an annual average of just 1% during the 80's (figure 3). Similarly, world feed grain trade averaged 73 million tonnes per year in the 70's, double the average level of the 60's. In the 80's, world feed grain trade has averaged 93 million tonnes, a modest 25% increase over the 70's (figure 4).

CORN PRICE: JAPANESE YEN/TON
(U.S. Gulf, 9/79 - 9/89)



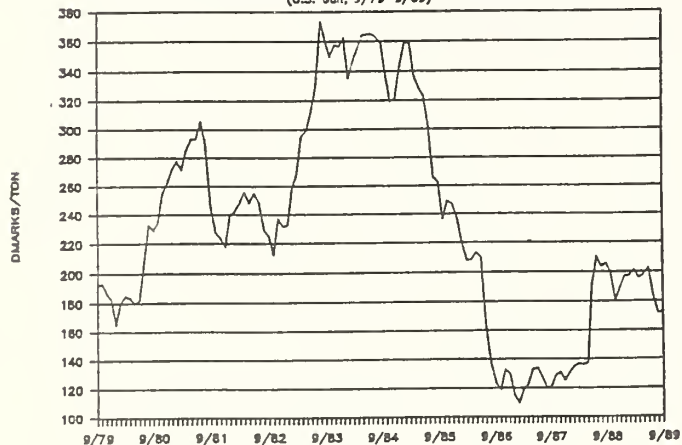
(FIGURE 1)

WORLD AND U.S. COARSE GRAIN TRADE



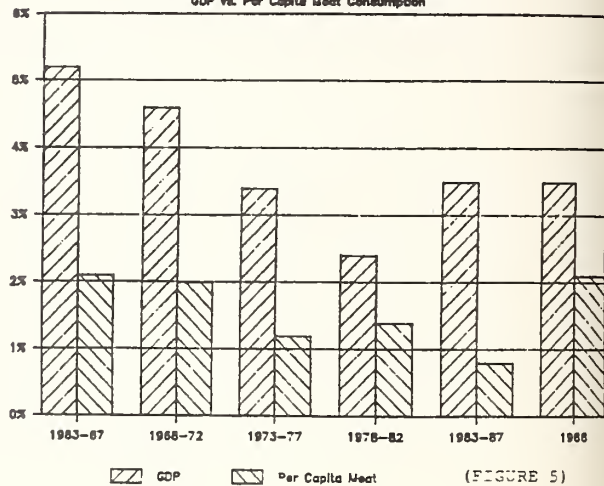
(FIGURE 4)

CORN PRICE: W. GERMAN D-MARKS/TON
(U.S. Gulf, 9/79-9/89)



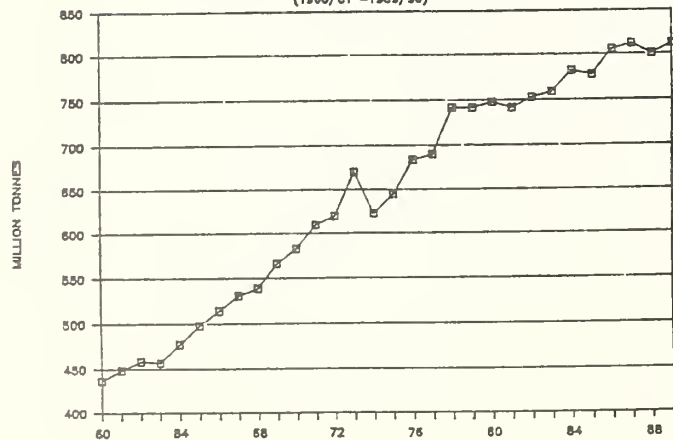
(FIGURE 2)

Annual World Growth Rates
GDP vs. Per Capita Meat Consumption



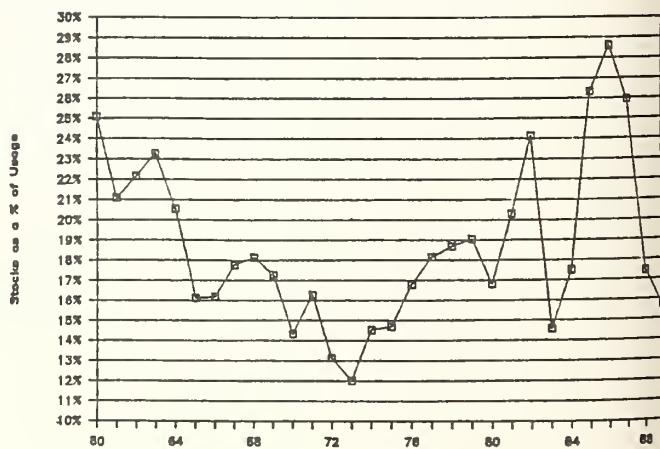
(FIGURE 5)

WORLD COARSE GRAIN USAGE
(1960/81 - 1989/90)



(FIGURE 3)

WORLD COARSE GRAIN STOCKS-USE RATIO



(FIGURE 6)

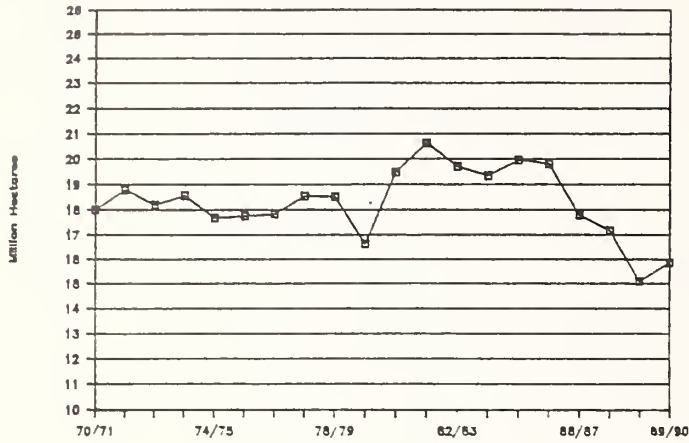
3. Increases in feed grain demand are primarily derived from increases in world meat production. Growth in world per capita meat consumption during 1983-87 was the lowest rate in at least two decades. There is evidence, though, that suggests that growth in world per capita meat consumption is beginning to accelerate (figure 5). Relatively strong growth in world GDP since 1983 supports this conclusion.
4. World stocks of feed grains, as a percent of usage, have declined sharply over the past three years, from a peak of 29% in 1986/87 to a projected 17% by the end of 1989/90 (figure 6). Excluding the 1983/84 year, the world stocks-use ratio is now at the lowest level since the early 70's. This decline is the result lower stock levels in both the U.S. and foreign countries. With demand rebounding, a return to the burdensome level of stocks does not appear likely.
5. Among our major competing exporters, acreage devoted to feed grains has fallen 20% since the enactment of the 1985 Farm Bill (figure 7). These reductions have come about in part due to shifting into oilseeds, but primarily as a result of U.S. feed grain prices becoming more competitive abroad, thus encouraging our competitors to reduce plantings.

Based upon these trends, there are three conclusions I have reached which have direct implications for U.S. agriculture. First, lower feed grain prices (in foreign terms), reduced world feed grain stocks, and increasing world meat consumption portend a favorable outlook for world feed grain demand as we enter the 90's. World feed grain demand increased by 2.5% per year during the 70's, but slowed to 1% during the 80's. I expect growth in world feed grain demand to increase to a rate of gain of 2-2.5% per year in the next decade.

Secondly, annual world feed grain trade ranged between 83 and 108 million tonnes in the 80's, and is forecast at 100 million tonnes in 1989/90. I believe it is likely that annual world feed grain trade will accelerate, reaching 150 million tonnes by the end of the next decade.

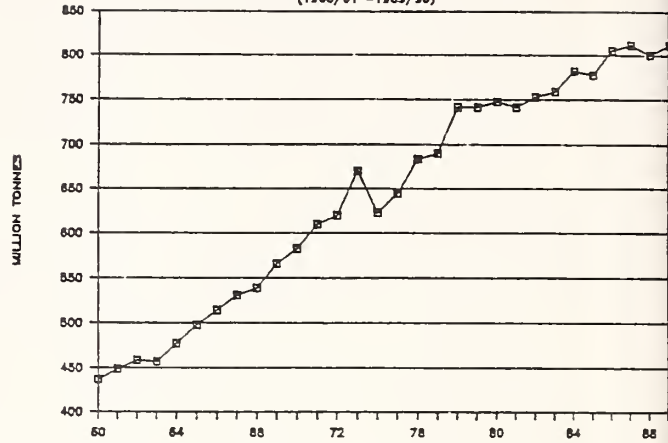
Finally, U.S. agriculture has the most to gain by increasing world demand. The U.S. has a competitive world-wide advantage in producing feed grains. Furthermore, there

Coarse Grain Area of Major Competitors

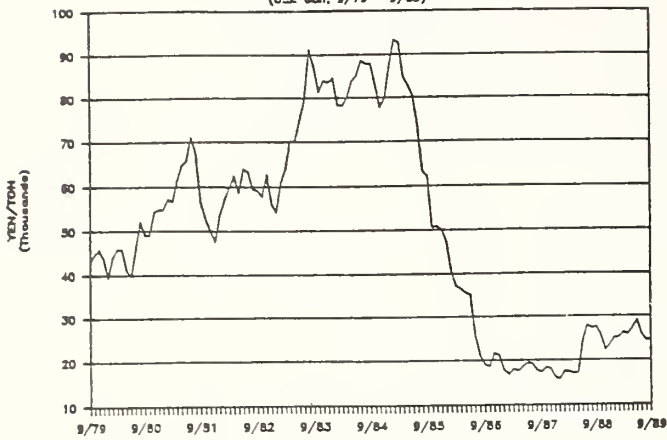


(FIGURE 7)

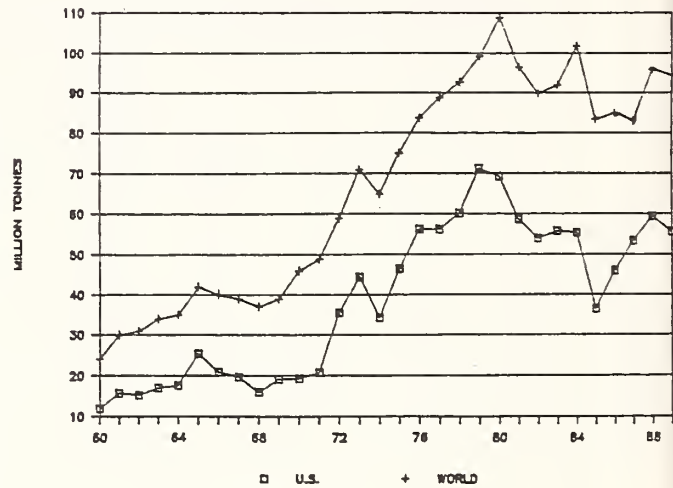
WORLD COARSE GRAIN USAGE
(1960/61 - 1989/90)



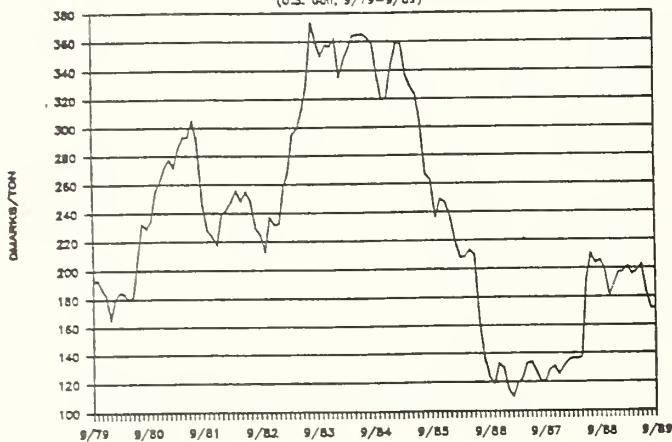
CORN PRICE: JAPANESE YEN/TON
(U.S. Conf. 9/79 - 9/89)



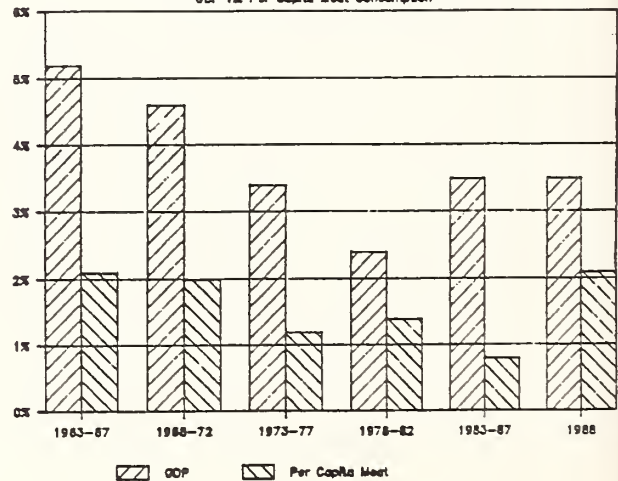
WORLD AND U.S. COARSE GRAIN TRADE



CORN PRICE: W. GERMAN D-MARKS/TON
(U.S. Conf. 9/79 - 9/89)



Annual World Growth Rates
GDP vs. Per Capita Meat Consumption



remains excess capacity within the U.S. to meet this demand: Feed grain acreage remains 10% below the levels reached in the late 70's and early 80's, and feed grain exports remain 10-15% below the peak level. As a result, the U.S. will have the most to gain by increased world demand for feed grains.

The 1990 Farm Bill

As we approach the debate on the next Farm Bill, it is prudent to briefly review where we have been. When the 1985 Farm Bill was written, there was justifiable concern about some serious problems in the U.S. agriculture sector. The financial crisis in agriculture was given deserved priority. The need to reduce the level of grain stocks was also a top priority. We could not compete internationally due to high price supports. Consequently, loan rates were reduced and government stocks were made more accessible, in order to make U.S. grains competitive in world markets.

Over the past three years, the 1985 Farm Bill has had great success in achieving these goals, as reflected in the rebound in the agricultural economy. Land values have ended their decline and have started to rise. Farm debt has been reduced dramatically, and farm income has been at record levels. Government outlays rose initially but have declined in the past two years. Finally, stockpiles of grain have been reduced from record levels to a more normal level.

Despite these successes, farmers remain hand-cuffed to set-aside requirements and planting restrictions. Farmers make decisions strictly according to the farm program, which may or may not coincide with market signals. These rigidities need to be addressed and corrected in the 1990 Farm Bill. Further, legislation must continue to emphasize the need to keep U.S. agriculture profitable. My suggestions are as follows:

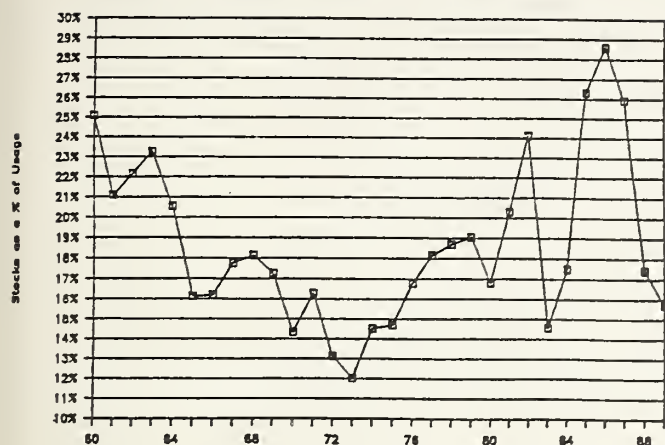
- 1) Put more acres back to work! A cap on total acres idled by government programs is essential to prevent erosion of the competitiveness of U.S. agriculture. This means keeping set-aside requirements at minimal levels. Short-term acreage idling schemes should be phased out in order to allow U.S. farmers, suppliers and processors to benefit from increased world demand in the next decade.
- 2) Keep loan rates at competitive levels. When loan rates are "high", the U.S. sends a clear signal to foreign producers that the U.S. will support their expansion in grain production. Competing exporters have the capacity

to expand feed grain production again, as they did in the early 80's, but will not unless U.S. policy gives them an incentive to expand.

- 3) Avoid an emotional response to hysteria about the integrity of our food supply. The major threat to U.S. competitiveness in world markets in the next decade is potential legislation to arbitrarily limit or eliminate agricultural chemical use in crop production. Such legislation would increase the cost of food and eliminate our participation in export markets. Safe food, safe water and a preserved environment are not incompatible with efficient agricultural production so long as decisions are made in the laboratory, based upon scientific evidence, and not on Good Morning America. This requires that we in agriculture need to be out front with positive, effective policies that solve contamination problems and do not avoid environmental issues. We need to help set the agenda, rather than react defensively.

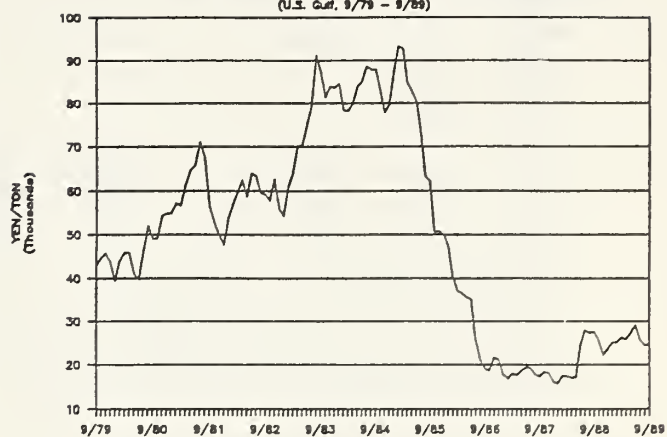
In summary, U.S. agriculture has been improving since the passage of the 1985 Farm Bill. The outlook for feed grains in particular has improved, as stocks have declined and prices have firmed up. The outlook for world feed grain demand in the next decade is very positive, as world trade is expected to increase sharply. This represents a tremendous opportunity for U.S. agriculture, but farmers will need to respond to market signals and have the flexibility to take advantage of these opportunities. It is essential that the 1990 Farm Bill take steps to keep U.S. agriculture competitive.

WORLD COARSE GRAIN STOCKS-USE RATIO

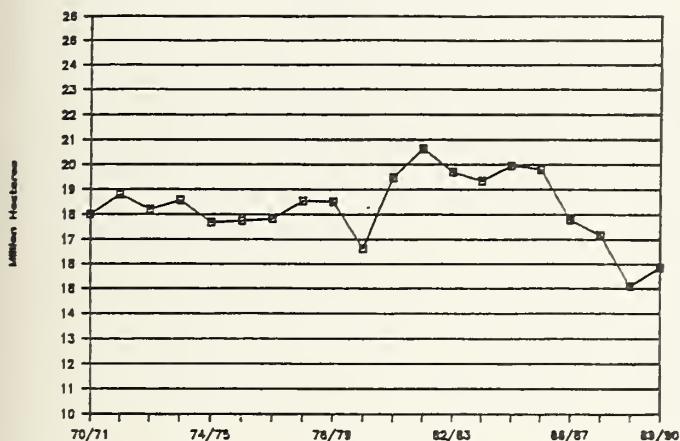


CORN PRICE: JAPANESE YEN/TON

(U.S. Cal., 9/79 - 9/89)

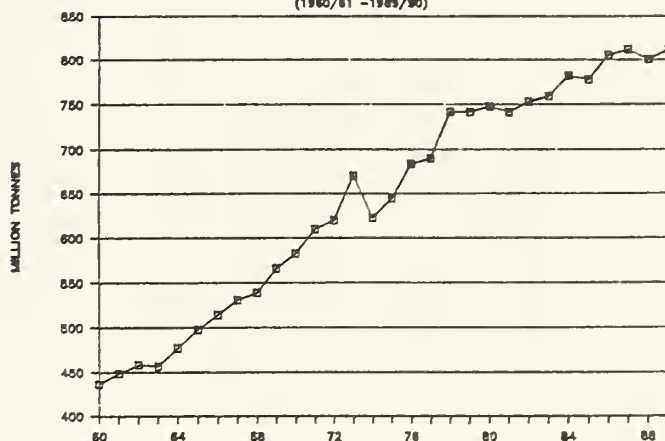


Coarse Grain Area of Major Competitors



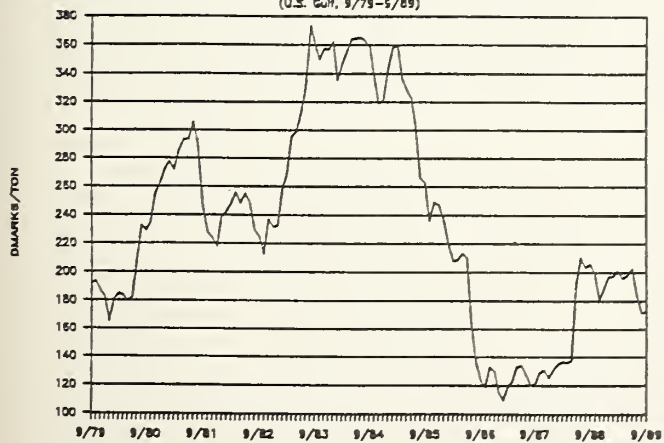
WORLD COARSE GRAIN USAGE

(1960/61 - 1989/90)

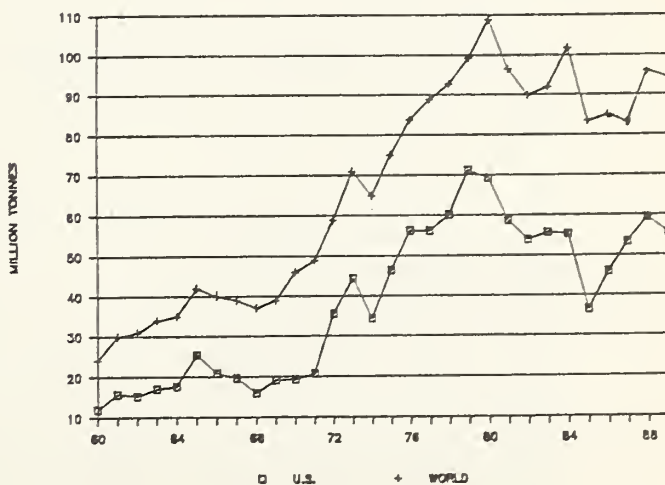


CORN PRICE: W. GERMAN D-MARKS/TON

(U.S. Cal., 9/79 - 5/89)

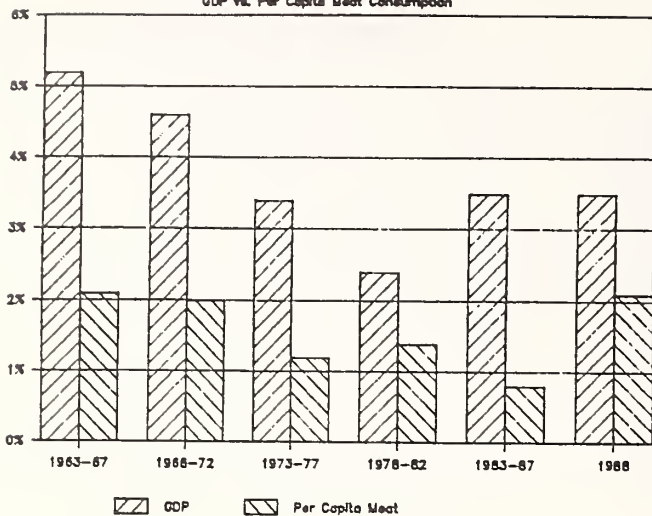


WORLD AND U.S. COARSE GRAIN TRADE

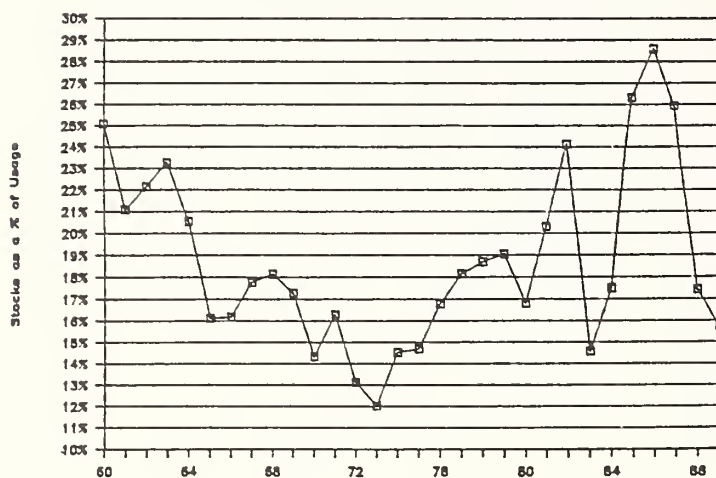


Annual World Growth Rates

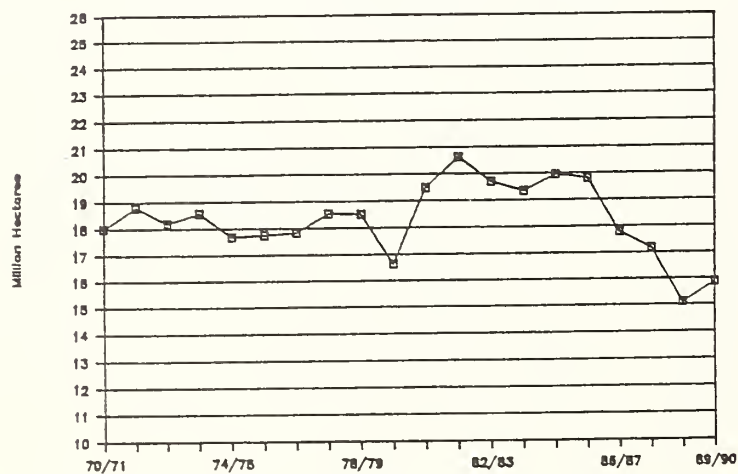
GDP vs. Per Capita Meat Consumption



WORLD COARSE GRAIN STOCKS-USE RATIO



Coarse Grain Area of Major Competitors





ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture

Washington, D.C.

Outlook '90, Session #

For Release: 11-29-89

GRAIN QUALITY AND INTERNATIONAL TRADE

Lowell D. Hill

Professor, University of Illinois

The relationship between grain quality and international trade has captured the attention of many people in industry and government. The emphasis on high technology harvesting, drying, handling and blending as causes of quality losses leads to the erroneous assumption that the problem is of recent origin. Two quotations will provide a more accurate historical perspective:

"I am informed that such conditions have become worse; that the purchaser here does not receive what he buys, and that no reliance can be placed on the inspector's certificate. The result is the miller has ceased to buy American grain for his mill and the farmer for his stock. It is further said that grain received from South America, Russia, or Romania arrives in good condition, that received from the United States alone being bad." [Congressional Hearings March 3, 1908]

"We have no doubt of the fact either, that some parties buying grain in the country, are in the habit of mixing at times, oats, rye, barley, screenings, or damp and unmerchantable wheat, with that of sound and good quality -- thereby much injuring the standing of our grain abroad, and consequently at home also." [Chicago Board of Trade Dec. 31, 1858]

The foreign complaints about quality, the fear of losing export markets to competition and the debate about the appropriate factors and factor limits have gone on almost continuously since the early 1800s. The same arguments have been heard over and over again. In many cases a change in grades has been made in one year only to be reversed in the next. We clearly lack objective, consistent and logical criteria on which to base a set of grades and standards that will best describe grain quality.

There have been suggestions that market prices and contracts can accommodate any quality issue and could compensate for any deficiency in the grades. The free market is the best allocator of goods and services among competing buyers and uses. However, the market does not provide a substitute for uniform grades and standards. It makes no more sense to expect the market to determine the appropriate level of damage for No. 1 soybeans or to determine the maximum allowable amount of foreign material in No. 2 corn than it does to expect the market to determine how many pounds there should be in a ton or how many inches in a foot. Standards of quality or weight are not based on laws of nature but are designed for the convenience of a market economy. Their ultimate test must always be that the information provided has

a value greater than the cost of obtaining it. Without standards the only alternative for buyers and sellers is to meet face to face for every transaction with the product physically in hand. The cost of that in a market economy is clearly prohibitive for commodities such as grain. Markets should and do establish price differentials on the various quality characteristics but the measurement technology, the characteristics to be described and the definition of factors must be determined uniformly on as broad a range of market transactions as possible.

When grades and standards were first introduced, each market and in some cases each buyer established their own set of grades and standards. A study in 1906 revealed over 300 grade names in use in U.S. grain markets. When the geographical scope of the market transactions were expanded to include all the major cities in the United States and then into international ports and processors such diversity became intolerable to buyers and sellers. The obvious solution of federal standards uniform throughout the nation required nearly one hundred years to achieve, but the U.S. Grain Standards Act was finally passed into law in 1916.

I am frequently asked why a problem as important as measuring grain quality with uniform standards, has not been resolved despite well over a hundred years of debating the issues. In my study of the history of grades and standards I have identified three reasons why these problems have persisted.

1. Many people in government and industry refused to accept that problems actually existed. A frequent response to foreign buyers' complaints dating back to the late 1800's has been that the foreign buyer is merely trying to negotiate a lower price; and furthermore, he is free to buy any quality he wants if he is willing to pay the necessary premium. So long as a high proportion of the industry maintained that no problem existed, then obviously it was difficult to persuade them to set down and talk about solutions.

2. Since the beginning of time, there has been an inherent adversarial tone in negotiations between farmers and middle men. The prophet Amos speaking in 750 B.C. accused grain merchants of "skipping the measure, boosting the price and cheating with dishonest scales . . . selling even the sweepings with the wheat." This adversarial attitude has continued down through the ages with farmers blaming the middle man and the exporters; Congress blaming the exporters and grain handlers; the exporters blaming the farmers for producing poor quality grain in the first place; and everybody blaming Congress either for acting or refusing to act on each issue. Prior to 1986, all of the parties involved were so busy pointing fingers at the other person, that no one was able or willing to discuss solutions. The national grain quality workshop formed in December of 1985 started a process of attitude adjustment.

3. In spite of all the debate, the changes in regulations and even amendments to the grain standards act, no one ever developed a set of objective criteria that included the economic functions of standardization. The purposes of grades and standards were "to facilitate merchandising." To most people that meant providing a numerical grade by which buyers and sellers could designate several characteristics with a single number. The usual

response to suggestions for change was generally that one set of arbitrary numbers was as good as another if the only purpose was to allow exporters and importers to order grain by numerical grade.

But the lack of a logical set of criteria left regulators and industry without a justification for current factor limits and no basis for selecting factors and evaluating alternatives. As a result changes were often made in response to current concerns only to be reversed a few years later. For example, when soybeans were first created in 1924 foreign material was defined as any material other than soybeans plus material falling through the sieve. In 1941 this definition was changed and a dockage factor was included in soybean standards. Dockage was defined as any material easily removed by screening and was subtracted as a deduction from total weight. Foreign material was retained as a grade determining factor with appropriate discounts above a maximum level set for each grade. Just eight years later, (in 1949) this decision was reversed and dockage and foreign material were again combined into one factor called foreign material. Forty years later the industry is debating if foreign material and dockage should be two separate items in corn and soybean standards. With no criteria on which to judge, no one has been able to generate the "best" set of grades and standards.

The Light at the End of the Tunnel

There is reason to be encouraged by activities over the last few years. We have not reached perfection by any means but we are certainly making progress and we better understand what needs to be done. The reasons for the optimism are

1. The entire industry now recognizes that there are problems. The condition in which corn arrives at destination is certainly a problem for many processors and cannot help but have some impact upon their attitudes towards future purchases. This in no way implies that U.S. exporters or U.S. farmers are entirely to blame for the quality deterioration. Without attempting to assign guilt, we have identified the problems that exist and their physical and biological causes.

2. With the discussions that were initiated under the North American Export Grain Association workshops and continued under the National Grain and Feed Dealers Association, all parties involved in grain production and marketing have come to recognize that the problem is the responsibility of all members of the industry and solutions can only come from working together. The adversarial attitude between producers and grain handlers changed during the discussions from one of "its all someone else's fault" to one of "I understand what you are saying", and finally, to one of "its everyone's problem and we can resolve it by working together." This leads to my optimistic view number three.

3. With urging from the grain quality workshops in their report to Congress, the 1986 Grain Quality Improvement Act incorporated four purposes for grades and standards. These purposes include the economic principles that have been so glaringly absent in all the previous discussions about changing grades and standards. With these criteria in place, we now have a potential for making real progress on solving the grain quality problems.

Purposes of Grades and Standards

The four purposes of grades and standards are as follows:

1. Define uniform and accepted descriptive terms to facilitate trade.
2. Provide information to aid in determining grain storability.
3. Offer end users the best possible information from which to determine end-product yield and quality.
4. Create the tools for the market to establish quality improvement incentives.

By themselves these purposes do not answer the question of which factors shall be included as grades and which ones shall be measured for information when requested. We need some additional criteria to make these more explicit. These criteria are the ones required to allocate factors among three categories: (1) grade determining (2) standards, not grade determining and (3) descriptive terms for informational purposes. I have generated criteria for allocating factors to each of these. These will provide a basis for discussion to develop a set of logically consistent objective criteria for future use.

1. Grade determining factors. Those factors that determine grade should be the ones related to purity and cleanliness such that the higher the level, the lower the value. For example, the presence of foreign material and damaged kernels lowers the value for all uses of grains. No one has ever asked the seller to add a little more foreign material to the grain which he has purchased.

2. Standards not grade determining. These are characteristics of importance to the majority of users. But the optimum values differ depending on the use to which the grain is being put. For example, there is no optimum protein content for wheat nor will all users desire the same relative value of oil and protein in soybeans. These characteristics would be defined, measured and reported on the certificate as part of every official grade. The market will determine the relative value of different levels for the various industries. In some industries, breakage susceptibility of corn would be of little importance and would probably generate no price differentials. In other industries such as dry milling, stress cracks and breakage susceptibility become a primary concern and large discounts might well be applied.

3. Factor information provided on request. There are an almost unlimited number of characteristics that one could identify that are of importance to someone in the description of grain quality. Many of these are important to industries utilizing only a small proportion of the total crop. For example hard endosperm corn will have a greater value to the dry miller than soft corn, but since dry millers take less than 5% of the total corn produced, one cannot justify requiring the entire industry to measure percent of hard endosperm on all corn harvested for the benefit of the 5% that might need it. There are many other examples of characteristics where information is of interest to individual processors, but not to the entire grain industry.

However, they may be of sufficient importance that the Federal Grain Inspection Service should standardize the methodology of measurement and provide that information upon request with the appropriate charges to cover the costs of the testing.

Ideal Grades and Standards

The criteria that I have outlined can, with some additional work by industry and government, provide the basis for establishing what one could call ideal grades and standards. If those criteria were clear and explicit, changes over the years could move the system of grades and standards closer to that ideal. Drastic changes implemented overnight are not recommended. Time is required for the industry to adjust with a minimum of disruption to the highly efficient grain trade. A review of the history of the last fifty years demonstrates that we have not moved in a straight line towards an ideal goal but have in effect moved in circles, coming back more than once to the same point at which we started. By having an ideal towards which we are moving, we can avoid the disruption of changes that do not result in aggregate economic benefits. Past practices of responding to whichever pressure group is currently effective in creating an alternative grade factor or in changing the limit on an existing grade factor often result in costs and disruptions that were not justified by the economic benefits.

The efficiency and effectiveness as well as the competitive position of the U.S. grain marketing system rely on a set of uniform grades, standards and terminology to describe the value of grain without the need for visual examination and testing of the lot by each buyer. With all segments of the industry working together and strong support from the educational institutions and extension programs, we can move towards the ideal and thereby increase the value and quality of our grain and our image in the international markets.

This is an outlook conference and some comments on likely actions during 1990 are obligatory. I predict that grain quality legislation will be included in the 1990 farm bill. Hopefully it will focus on policy guidelines, not on the details of grade factors and their limits. I predict that more end-use characteristics will be included in grain grades. I anticipate a tightening of grade limits to better describe true value of each lot. I believe grades will tend to follow the trend in export contracts to identify those characteristics of quality needed by the different end users or processors. There is a clear and important trend underway for producers to identify what the market needs and try to meet that demand instead of hoping to find a market for whatever is produced.

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FEDERAL POLICY INITIATIVES*

Roland Vautour

Under Secretary for Small Community and Rural Development
U.S. Department of Agriculture

I would like to discuss what we in USDA view as the need for rural development, where we are, where we've been, and where we hope to get and how we hope to get there. First, the good news. We are in the 83rd month of the current economic expansion, an unprecedented achievement in peacetime. And furthermore, I don't look for a major recession or even a recession in the foreseeable future. In that time period we created 20 million jobs. They belie the belief that the United States can't compete, that we're being outmanned and outgunned by the Europeans and by the Japanese. In that same period of 83 months our industrial production increased 33 percent in the United States; that's double the rate of the European Economic Community and more than that of Japan. And we've also been able to keep inflation at a rate of less than 5 percent.

Now that's all the good news. The other side of the situation is that rural America is in need of help. In the early 1980's we had a grain embargo; we ran into a very, very strong dollar, a global recession, land values had plummeted, debt levels were at an all-time high for rural America and for the farmers in particular because in the decade before that we had encouraged them to plant fence-row to fence-row and encouraged them to go into debt at unprecedented levels. And then we ran into this global recession. Our trading partners as a result of the grain embargo didn't trust us as trading partners, sought markets elsewhere and we have been struggling ever since to regain those markets. I'm confident we will. But it's been a process over the last several years that has really wreaked havoc on parts of rural America.

Up and down the two coasts of the United States, parts of rural America in those areas are not doing too badly. But the vast area in between the two coasts needs a lot of help. The 1985 Farm Bill provided some help. In 1987 we had \$57.2 billion in cash farm income, the highest ever. And in 1988, despite the drought, we had \$59 billion cash farm income. And we have every right to expect that 1989 will be at a high level, although probably not as high as in 1988. Land values, which plummeted to about 50 percent in the early 1980's, have since regained almost 30 percent.

In other words, the farm economy has prospered. But rural America still hurts. Four hundred thousand people per year are leaving rural America to

*Based on a transcript.

find more and better employment at a better wage. We find in the Farmers Home Administration, for instance, that 60 percent of family farmers require off-farm income in order to stay viable.

And the face of rural America is changing. Twenty-seven percent of the population lives in rural America, yet only 2-3 percent produce all of the food and fiber necessary to feed and clothe this country and a good part of the rest of the world. We have better machinery, better fertilizers, better seed strength, better management, and we're producing more and more commodities with fewer and fewer people. That does not bode particularly well for the other 25 percent of the rural population not directly connected with production agriculture. People have said, "Well, all you really need if you want rural development is to fund the farm programs." That's not enough anymore. When 25 percent are gaining their livelihood from something other than production agriculture, it behooves us to have a healthy, well-rounded rural population.

Given this situation, what role does the Federal Government play in this whole process of rural development? I can tell you one role it can't play; that is shoveling tons of money at this problem. It's been a terrible struggle trying to meet the Graham-Rudman-Hollings sequester at \$110 billion this year. Next fiscal year, 1991, that Graham-Rudman trigger is at \$64 billion. That is \$50 billion less than this year. Now we have every right to expect that we will be funded on, I think, an even basis. But we don't have any right to expect, and I don't think we'll get, massive amounts of new money. And very honestly, if massive amounts of money had been the answer, we wouldn't have a problem today.

But the Federal Government does provide a vital service. We are in a position to furnish help on infrastructure. That's a badly overused word, but I can't think of a better one. You can't have development without water, you can't have development without sewage, you can't have development without community facilities, fire trucks, ambulances, schools, and all the good things that go to making life in rural America a little bit better and a little bit more attractive to business and to entrepreneurs. The Farmers Home Administration has those programs. We have also in the Rural Electrification Administration programs that provide power, and you certainly can't have development without power.

We help with housing, both in HUD and Farmers Home Administration. And the industry loan guarantee program that we have can be used to leverage out more private money for business. And by private I mean State, local, as well as private individuals and companies. But given the fact that we're not going to have a lot of new money, we have to look at it a little differently than we have in the past, and ask how can we get those funds that we do have to those areas that need them the most. In other words, targeting.

You're going to be hearing more and more about it. We are going to have to take the monies that we've got and use them where they're most needed. I always use the illustration of Greenwich, Connecticut. Now that's probably

the highest per capita income area in the country, if not in the world. Yet, go 20 miles outside of Greenwich and you're in rural America. And those rural Americans qualify for all of the programs that Rapid City, South Dakota, qualifies for, or Bismarck, North Dakota, or Creston, Iowa if you will. And yet, Greenwich area people are fully capable of doing these things for themselves and can afford to pay for it. But it's federal money; they're entitled to it. It's also a waste of good, valuable, precious resources that can be used in areas that need them the most.

About 6 months ago the Secretary asked me to form a task force to look at USDA programs and to come up with a series of recommendations that he can administratively use to get the Department funneled, channeled and aimed at getting these things accomplished. That report was submitted in August, with 17 recommendations. Many of them have been implemented. Many remain to be implemented. I have that report. It is available to you.

Among some of the things that have been recommended is the formation of a rural policy council in USDA. I ought to know what the Forest Service is doing in terms of the number of billions of board feet they're permitting to be cut in a certain area. They ought to know, for instance, what I'm going to be doing in terms of being able to finance something for a value added manufacturer in that area. We ought to know what each one of our agencies is doing and be able to coordinate them so that we get a bigger bang for the buck.

The Department has also instigated a Rural Information Center which I think is invaluable to many, many people out there in rural America. A community can have a specific problem, be it toxic waste, solid waste disposal, deteriorating roads, bridges or whatever. They can contact their local county extension agent and get valuable information from the Rural Information Center in Beltsville at USDA's National Agricultural Library. Through the Center they may learn what other communities have done to solve the same problem.

The President was in this very room in May and said to Secretary Yeutter, "Mr. Secretary, I want you to chair a working group of the Economic Policy Council" -- now that's cabinet level -- "want you to chair a working group of all of the Departments in the Federal Government that have a role in rural development. I want you to come back to me with a report as to what we can do to be budget neutral and better coordinate the efforts of the Small Business Administration, the Farmers Home Administration, and the Department of Commerce, and procurement from the Department of Defense and put that together in some kind of a meaningful approach to facing this problem."

There were some seven major recommendations in that report. Unfortunately, I'm not at liberty to divulge them because they're just now on the way to the President. And we hope that those will be available sometime shortly for general distribution and that the President will make that announcement.

But having said all that I've said, rural development in the final analysis rests on local leadership -- from Washington, we cannot do that job for a

local community. It's up to that community to decide what they want to be, how they want to be, what they need to get that job done. And I'm delighted that we had two representatives from the local level here to be able to tell you exactly what they're doing and how they're doing it.

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STATE ROLES AND RESPONSIBILITY*

George Mickelson
Governor of South Dakota

I have the privilege of serving as one of the Nation's governors during this very important time in this Nation's history, and I also have the privilege of serving as Chairman of the National Governors Association's Agriculture and Rural Development Committee. So talking about rural development is kind of old hat for the 3 years I've been Governor. That is an issue that I work on every single day. I think that the whole theme of my remarks is that we're not here suggesting that the Federal Government, as has been suggested in the past, be the cure-all for these ills. We're not complaining about our fate or where we find ourselves; we are here, as Mr. Vautour has indicated before, to establish a partnership relationship.

We're living in a different kind of world today. My father was Governor of South Dakota 40 years ago. And I've had the privilege of going back and reading his inaugural messages and his State of the State messages. Although he spoke about development, about REA and about building roads, it was indeed different 40 years ago.

Let me set the stage. In the contemporary world that we live in, we're going to have to do some things differently than we've done before. Let me talk about South Dakota. It's important to understand that in 1960 South Dakota had some 65,000 farms. Today we have some 35,000 farms, and the average size of each farm has gone up to about 1,278 acres. Counties all over my State are losing population, while certain metropolitan centers continue to receive rural America's refugees seeking an opportunity so that they can raise their families on a reasonable living standard. These people are leaving areas that technically are not categorized as rural, but in many instances, frontier. What works in rural Maryland or upstate New York, or downstate Illinois, won't necessarily work in my State, where we're not talking about rural areas since 60 percent of South Dakota is categorized as frontier. Most of the articles I read and speeches I hear about rural development do not appear to understand exactly what it is that we're describing.

For example, in much of my State -- and in the West generally, having a choice of which school to attend might mean an additional 100 miles per round trip a day. We're talking about rural health delivery systems, which is very much a part of rural development in all of this Nation; we're talking about struggling to keep clinics and hospitals open with policies that have been set through Medicaid and Medicare that don't recognize the difference in

*Based on a transcript.

rural America as it is in some other parts of this Nation. We're talking about rural telephone cooperatives that have an average customer base of 0.5 per mile of telephone line.

As was indicated by Mr. Vautour, things are better than they were a couple of years ago during the height of the agricultural crisis. Our farm bankruptcies are down. When I was elected to this office, we led the Nation in farm bankruptcies -- numbers, not percentages: over 900 farm bankruptcies. So far this year we've had about 44 Chapter 12 reorganizations. But also, counties in some parts of my State have lost 15 or 20 percent of population since 1980.

South Dakota was also lucky enough during the agricultural crisis to buck the trend. We actually had a gain in population while most of our neighboring States had declines with a moderate growth of about 3.2 percent. And so as a whole, South Dakota is growing. But counties in the interior are sparsely populated and people are moving to the more populated areas.

Today, 55 percent of all South Dakotans live in 16 counties. For anybody who doesn't believe that transportation is an extremely important part of rural development, those 16 counties are all around major interstate highway intersections or interstate corridors and areas that are served by essential air service.

So the thinning of the population in the interior is creating many problems. Diversification of these areas has been one of the top priorities that I have worked on since election. And we're the most agricultural State in the Nation in terms of the proportion of our people directly involved in agricultural production and our gross State product. And it remains the top economic concern for South Dakota. But it is also very clear that we must protect ourselves from the wild fluctuations in agricultural economy that we've had from year to year. The best farm policy is one that understands cooperation in all levels of government towards diversification of our economy and allowing our people to stay on the farms, but also to earn a decent living in other ventures if they so choose.

Let me give you an example already cited here today. Nearly half of farmers' incomes arise from off-farm sources. Many of these farmers have done so out of necessity so that they can remain on the farm which is a way of life and the way that they want to keep it.

My own South Dakota Department of Labor is predicting that farming as an occupation will have the second largest decline by the year 2000 of any occupation in this Nation. This spells more trouble for rural towns that depend on farmers for their retail market. Now obviously the health of the Nation's macroeconomy is important for these areas because, as we all know, high interest rates do more damage to the farm sector than probably anything else. And in this sense, it is important that we also work with the Federal Government on the budget deficit and that it be dealt with aggressively.

I don't want to give anybody the impression that I am here to cry about the situation, but I'm here to instead offer some solutions as to how I think that we ought to tackle it. And Mr. Vautour hit the nail on the head. As he indicated, local leadership is the most important ingredient. We aren't here asking that the Federal Government bail us out; we are here asking that we develop a partnership relationship so that we can continue to implement the many programs that the States have been asked to do for the last several years. Rural economic development must be given a prominent place in policy circles here in Washington; and I believe that there are many reasons to think that that is, in fact, happening. Like urban development a few years ago, rural development is becoming a key word. And I am encouraged by that.

I'm very pleased with the progress that has been made by Congressmen English and Coleman on their rural development legislation, House Bill 3581. This legislation gives the States the flexibility to make the link between Federal programs and our own State programs. The key is flexibility. Remember, I said that 60 percent of my State is frontier. So rural programs, rural guidelines, rural policies that are developed here in Washington that are expected to work in all parts of this Nation don't work. We must be allowed to determine our own priorities, and then we must suffer the fate of our own leadership if, in fact, we aren't strong enough to see them through.

As an example, probably going back to the Nixon Administration, States have been told to do for themselves, under revenue sharing, or under the block grant program. Local governments were encouraged to set up the infrastructure so that local prioritization could be set up and that those monies could be used then to meet the local needs, and we have done a good job in my opinion as States taking up the slack at the State and local levels. The English-Coleman Bill rewards States for this effort. Let me be just a little more specific.

The bill will create a delivery system for rural development programs, one with a strong linkage between local, State and federal organizations. I'm sure that the mayor can point to programs or to people or to a decision process in his local community that will fit into the linkage that I'm talking about. Local entities will be required to have in place a long-term economic development plan to participate under the bill. Planning and setting priorities is something that all of us must do in order to develop our communities. The plan will be reviewed by a rural economic development panel which will be made up of people who have knowledge in economic development and will include representation from higher education, banking, rural electric, telephone cooperatives, development organizations, small business development corporations and State government officials in charge of existing development programs. And the beauty of the plan is that these people are already in place. New infrastructures do not need to be set up in order to implement the program. I could implement the program in South Dakota tomorrow.

Let me discuss with you a couple of examples of what we're working on in our State. Many small communities in my State lack full-time development people; they don't have the technical assistance. But we have encouraged local

leadership through several programs we've developed. We have a program called GOLD. That's an acronym for Guide to Opportunities for Local Development. The program is designed to entice communities to do a self-assessment of their needs. We see our responsibility not as doing it for the local communities, but perhaps providing them some expertise in setting their priorities and planning. Maybe a small community believes it doesn't look nice from the entrance, and cleanup might be their number one priority. Maybe they believe that their future lies in the formation of a local development corporation so that they can take advantage of some of the programs or issue bonds or receive loans. The importance is that it is determined on the local level.

Working closely with this program is a new division that we created in the Governor's Office of Economic Development last year called the Division of Rural Community Development. This division has the authority to cross departmental lines, to get assistance so that with one telephone call, mayors or development people in those communities, can get an answer and assistance if necessary in areas of rural development -- job creation, education, health care, technical assistance, water and sewer. Many communities are dealing with water and sewer infrastructure shortcomings.

As Mr. Vautour indicated, this Nation as a whole has experienced economic growth, but in rural America we have not shared in that. But we also needed to pull ourselves up by the bootstraps and be able to compete for those jobs. Much of it is mindset. When companies talk about expanding, it's my job to make sure that people know that there is a United States between New York and Los Angeles. A lot of exciting things are going on in the Midwest and in the Plains States.

In 1987 I asked our legislature (4 days after I was inaugurated) to raise our sales tax by \$.01 for a period of time to create a revolving low-interest loan fund. One of my most important jobs is to help businesses and job producers in my State to lower their cost of capital. We created a \$40 million revolving loan fund to finance economic development projects. Not to dole out money to companies that aren't going to make it, but to take a good strong look at companies that might want to expand into South Dakota or to help existing businesses grow. The program has a 13-member citizen board made up of a broad mix of men and women who are professionals, including farmers, bankers, retailers and other business people across the State. The ready fund is a low-interest loan program that can be used to finance relocations or expansions, and out of that \$40 million which took us about 10 months to accumulate, we repealed the tax. So far we have loaned about \$25 million out of that fund which, by the way, has been leveraged about four to one with private investment or other types of capital investment. But it's interesting to note also that 27.5 percent of those loans have gone to communities under 2,000 in population. Now that makes up about 90 percent of the communities in South Dakota. About 16 percent of the loans have gone to communities between 2,000 and 5,000 and 25 percent have gone to communities between 5,000 and 15,000 in population. So we have had some success in helping small communities help themselves. These funds have created jobs in towns of 800. Now while \$25 million that is loaned out from the ready fund

may not seem large in New York or in Washington or in Los Angeles, in fact creating 25 jobs in a town of 800 is an extremely tremendous boost to the economy of that town. But probably just as important, it has brought the communities to their feet, to make them want to compete, to make sure they aren't just sitting there cussing their fate.

We've developed some other programs in rural areas of our State. We developed a Future Fund Program, where we took a look at how research and development have played such an important part of development of economies of different parts of the country. The fund pumps several million dollars a year more into research and development in higher education institutions. I want to compete as a rural State for national science foundation money, and we do. We failed on three or four applications in the early eighties, but we are now succeeding. We set up some of the USDA's rural development money into a livestock loan program. We have, because of the drought, the lowest livestock numbers in our State since 1962.

We enhanced the Conservation Reserve Program and were the first State to do it. The CRP Program is very important in our State. For farmers who sign up for CRP, maybe their biggest need is immediate cash. We're not going to give it to them, but we calculated the present value of their 10-year contract and paid them the present value of that. And, therefore, we leveraged a Federal program, had no impact on the Federal budget, and we didn't ask for any money. And it did, in fact, help several farmers pay off high-interest loans.

Even though we've developed many of these economic tools, it's difficult to accomplish our goals alone. We understand the budget situation that Congress and the Administration are facing, however, and I'm not asking that we just appropriate more money for programs. But we are asking for a prioritization of the programs for flexibility so that we can continue to use these kinds of programs in rural America. The English-Coleman Rural Economic Development Bill goes a long way in that direction. It's approach in rural development is consistent with the findings of the National Governors Association report, New Alliances for Rural America.

In closing, I would just like to share with you an editorial in the Des Moines Register of several weeks ago. The piece was written by James P. Gannon, the editor. Although there are times when I find myself not agreeing with the Des Moines Register, I think this editorial touched on something undeniably true. It speaks the truth in a way that I think is very important.

"I do not believe that the fate of any given small town will be decided by its location in the State or by its access to water or highways or resources or other objective characteristics. These factors can help or hurt economic survival, but the essential ingredient is something human, unpredictable and immeasurable. It is that elusive thing that we call leadership. Leadership is vision, some notion of where the future lies and how to get there. Leadership is guts, the willingness to step up and make hard decisions, take risks, step on toes and maybe fall flat on your face trying, but nonetheless try. Leadership is energy, the

determination to keep going when everyone else tells you that it's a lost cause. Leadership is looking in the mirror every morning and saying, 'It's up to me; nobody's going to do it for me.' You do not have to be elected to be a leader. You have to care to decide to do something and to enlist like-minded people in doing. In my view, that's what small towns need to survive -- a spark of leadership by committed local people willing to risk failure in order to reach success."

These leaders exist in rural America. They exist in the small towns across this great Nation. But many are isolated and many are frustrated because of issues or forces that they can't even see. They are stepping up to the plate every day and pledging their support to meet halfway. And as one elected leader, I want to meet them. Realistically it's not possible for everyone. The scarce financial resources won't allow it. But those who want to improve their situation, for those of us who are trying, we must continue to try to meet the gap in their needs. So today I would ask our Federal partners to join me, the Nation's governors, and Congress to get behind the effort already initiated in Congress and begin to move all of the players in the same direction--to provide opportunity for rural America.

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NEW RURAL DEVELOPMENT LEGISLATIVE PROPOSALS

David Freshwater
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At the present time there are two separate pieces of rural development legislation under consideration in the Congress. In the Senate S. 1036, the Rural Partnership Act was reported out of the Agriculture Committee and passed on the Senate floor on August 2. In the House of Representatives, the Subcommittee on Conservation and Credit reported H.R. 3581, the Rural Economic Development Act of 1989 to the full Agriculture Committee on November 14. Although a scheduled markup on November 24 was postponed, the bill is supposed to be considered early in the new year by the full committee. In testimony on November 8, the Administration indicated its general support for the provisions of H.R. 3581. These events appear to put us at a point last seen in 1979, just before the passage and signature by the President of the Rural Policy Act of 1980.

How did rural development legislation come so close to passage this year after the failure to move legislation in the past? Is it premature to suggest that there will be a substantial change in the legislation and policies governing the Federal government's involvement in rural America? Most importantly, can we conclude that rural Americans will see any significant improvement in their condition if the legislation is passed? Finally, can we reasonably expect substantial rural development legislation in the 101st Congress?

The current round of legislation has its roots in the 100th Congress. In the summer of 1988 the Senate Agriculture Committee failed to report S. 1729, the Rural Economy Act of 1988, out of Committee just before the summer recess, after having spent a large part of the year in an effort to build a consensus to support the legislation. In the House, the Chairman of the Subcommittee on Conservation, Credit and Rural Development held a

¹ The opinions expressed in this speech are solely those of the author. They are not the opinion of the Joint Economic Committee or any Member of Congress.

number of hearings to try to develop interest in companion legislation but could not develop any support for the idea.

Yet in 1989, the Senate was able to move S. 1036 out of Committee on a unanimous vote and pass the bill on the floor of the Senate by a significant majority. In the House H.R. 3581 moved out of the Subcommittee unanimously. The Administration, in a major change of previous attitude, has endorsed the major provisions of H.R. 3581 suggesting that we may in fact see new rural development legislation passed into law. What explains this current round of apparent successes? Will they be continued?

The Rural Partnerships Act of 1989

The current Senate bill is not all that different in concept and approach from the 1988 legislation. While the particular programs proposed differ in terms of technical factors, the broad concepts are the same. In both years the Senate adopted an incremental approach to rural development legislation adding new provisions and modifications to the existing program structure. In both pieces of legislation the additional spending was very modest. The 1988 legislation never reached the point where a total cost was developed but the 1989 bill authorizes roughly \$1.5 billion over a five year period. In both legislative proposals an attempt to adopt a comprehensive approach to rural development was made. Provisions to: help establish and expand rural business, improve physical infrastructure, provide technical assistance, improve education opportunities and expand the information base of rural America form the core of both pieces of legislation.

It seems to me several factors account for the passage in the Senate this year of essentially what failed last year. First, this was a more opportune time. The Democratic leadership in the Senate agreed to make rural development part of the legislative agenda assuring a bill would be considered. In addition with a change in Administration it was no longer clear that any effort to change legislation would be rejected out-of-hand. Second, it appeared that there might be some additional money in the budget. While it is now clear that the \$300 million that was talked about is the increment to the current services budget, that was less obvious in the spring and summer of this year increasing the attention of members and rural interest groups. Finally, there was a happy confluence of events, whereby the rural development bill managed to become paired with the 1989 disaster assistance bill, in both the full committee and on the Senate floor.

As noted above, The Rural Partnerships Act can best be thought of as making changes at the margin. While there is scope for legitimate debate about how big the marginal change will be, the bill neither provides a lot of new money, nor does it reallocate existing funds to different uses. Given our inability to articulate a national rural development strategy that can be endorsed by the majority of the people and organizations interested in rural America, the decision to do a number of small things in a number of different areas may be both sensible politically and a pragmatic approach. You at least have the hope of fixing one person's problem without making another person's problem worse.

One can argue that there is considerable opportunity for significant benefits to flow from the new programs authorized in the Senate bill. For example, Title I provides several methods for improving rural businesses' access to capital; in each case requiring that local institutions participate in the program in some way either through putting up their own money or by providing other support. Similarly, the efforts to improve the data and knowledge base of rural America in Title VII of the Senate bill have the potential to make significant improvements to our information. In summary, the provisions of S. 1036 are unlikely to have a major impact on rural areas in the aggregate, but are likely to be very useful to particular groups in rural areas who will find what appear to be relatively modest changes in the aggregate very important to them.

The Rural Economic Development Act of 1989

Since legislation in the House has only cleared the subcommittee at this time, projections about the final form of any legislation passed by the House of Representatives are subject to being well off the mark. However, I am assuming that the Administration endorsement of H.R. 3581 counts for something, and the lack of opposition in the subcommittee, where one member had a competing bill with over 100 cosponsors, suggests fairly strong support. However there are many potential hurdles at the full committee level and on the floor of the House.

At the beginning of 1989 there appeared to be less enthusiasm for new rural development legislation in the House than in the Senate. Initial indications were that a series of hearings would be held by the Subcommittee in 1989 to develop legislation that could be included in the 1990 farm bill. Given the lack of commitment to promoting rural development legislation by the House leadership at the time, this seemed a strategy more likely to succeed than plunging ahead with a bill. In addition, the failure of the Senate to move a bill in 1988 suggested that it might be prudent to see if the votes were there in the Senate

before spending political capital in the House. Successful passage of a bill in the Senate certainly contributed to the pressure for a separate rural development bill in the House in 1989.

Unlike the Senate bill, the English, Coleman, Gunderson bill is very new legislation. Following an exhaustive round of hearings by the Subcommittee on Conservation Credit and Rural Development, where virtually every rural interest group had the opportunity to argue for support for their particular issue, a bill was introduced that adopted a fairly radical approach. More conventional bills had already been introduced in the House and had received considerable support. In particular H.R. 3382 introduced by Mr. Tallon attracted over one quarter of the Members as cosponsors. The Northeast Agricultural Caucus through Mr. Boehlert also introduced a bill. For the most part these bills built on the Senate legislation and existing programs.

The contrasts between H.R. 3581 and the other rural development bills are somewhat staggering. Rather than following the conventional approach of developing new programs and integrating them into the existing program structure, the House bill proposes a significant reorganization of rural development activities, and most importantly a major change in the procedure by which federal funds are allocated. At a local level communities would first have to develop an economic development plan and have it approved by a State review board. The communities would then submit projects to the review board, which in turn would rank the projects and make recommendations to the Secretary of Agriculture for funding. Each state would have available a block of funds based on appropriations for the programs in the Rural Development Insurance Fund portfolio. These funds could be allocated to any type of project that meets criteria specified in the legislation.

The bill starts from the assumption that there will be no significant increase in appropriated funds for rural development, either through reallocation from existing USDA programs or from new appropriations. This requires that any change in the allocation of funds has to come by redirecting existing programs to new uses. If at some future time the appropriations process does add additional funding the revised structure has the flexibility to allocate the money where it is best used.

The legislation represents a major change in approach since it fundamentally converts existing, project specific programs into a state block grant. Historically, the House has been very reluctant to embrace the idea of block grant funding, making this an even more radical approach. In addition, the bill contains other provisions that focus the Business and Industry Loan

Program on smaller loans, and which expand the powers of the rural electric cooperatives and rural telephone cooperatives to facilitate rural development. In addition, there are minor changes in the Farmers Home water and waste programs, and expanded authority for the Rural Electrification Administration and the Farm Credit System to fund sewer and water loans.

However, the radical nature of the legislation is a major reason for concern about its ultimate passage. Since it proposes no new funds, only a reallocation of existing funds, from an interest group perspective we are talking about a zero-sum game. Any increase in one group's support must come at the expense of another's. As the reality of this sinks in, opposition to the bill is likely to increase. After a cost-benefit calculation, many interest groups will conclude that the possibility of lower revenues offsets the benefit of potentially higher revenues in a competitive environment with no additional funds. The bill under consideration in the House may be good public policy but it faces some major political opposition from rural interest groups threatened by change.

If H.R. 3581 fails to pass, it is likely to mean the end of rural development legislation in the near term. The 1990 farm bill will occupy the agriculture committees attention all of next year. In particular, the Conservation, Credit and Rural Development Subcommittee in the House will have more than enough to consider without trying to revive rural development legislation. Although there may be a bits and pieces called rural development in the farm bill, the pieces are likely to be farm legislation disguised as rural development language. Historically, there has been little interest in doing rural development legislation in the farm bill and this situation is likely to continue.

The Conference Committee

Suppose for arguments sake that The Rural Economic Development Act of 1989 emerges from the House in a form not very different from the current bill. What happens in conference? Already there is growing concern that these are two fundamentally different approaches, which will doom the conference to disaster if both bodies insist on their version being the final bill. At face value the differences in approach used suggest that this is not an improbable outcome.

However, in the past, radically different pieces of rural development legislation have gone to conference and a compromise has been reached. The 1972 Rural Development Act emerged from three radically different perspectives. The Administration favored block grants, the Senate wanted to create a major new

cooperatively owned rural development bank, and the House wanted to make marginal changes in existing programs. Ultimately in 1972 we wound up with marginal change in existing legislation. Two contradictory conclusions can be drawn from this experience; both of which are generally true but neither of which may be applicable this time. The first is that the House generally prevails in conference committees. The second is that marginal change generally prevails over radical approaches in conference committees.

In this case it seems to me that the best solution, from the perspective of the public interest, is that neither side prevail, since each bill alone accomplishes far less than they do collectively. While very different approaches have been adopted by the two Congressional bodies they are not fundamentally incompatible. The Senate bill essentially leaves existing programs intact and defines new approaches to fill in gaps that current programs do not cover. Since it doesn't intend to alter existing programs, it implicitly operates from the assumption that the rural development problem is significant enough to warrant a modest increase in funding. By starting from the assumption of no additional funds, the House proposal finds itself having to reorganize existing programs rather than create new ones. Because they approach the problem from different perspectives, the two pieces of legislation do not conflict in their major provisions.

More importantly, they do not conflict in their basic intent. It is increasingly clear that the federal capacity to resolve the problems of rural areas is very limited. Our old programs don't work very well; and it is questionable whether requirements placed on the federal government that it treat individuals and organizations equally are compatible with the diverse needs of rural America. Both the House and the Senate legislation push decision making, and responsibility for rural development, down to the state and local level. The new provisions of the Senate bill tend to provide authority for rural development initiatives to private sector, non-government organizations and to local governments. The House bill transfers much of the decision making for current programs to state level boards. The net effect in both cases is to increase local control over the implementation of rural development programs, but maintain a federal oversight role with the ability to reallocate funds to ensure that national goals are met.

What would you get by combining the two approaches?

In the first place there are pieces in the Senate bill that can improve the effectiveness of the House bill and vice versa. The planning, evaluation and approval process central to Title II

of the House bill is dependent on communities having access to data and the ability to use it to create development strategies. One of the few things we know with certainty about rural areas is that data and data analysis capabilities are woefully inadequate. In the absence of the Senate bill's data collection provisions and its provisions for expanding the Extension Service's rural development capacity, it is questionable whether the intent of the House bill that communities plan and organize can be met. Most communities already are unable to deal with relatively simple project proposals, and strategic planning requires another magnitude of data and knowledge.

Similarly, the focus on rural job creation and business finance in the Senate bill, in conjunction with the House provision to amend the B&I program, creates a comprehensive package of assistance for small business. The assistance requires that individuals and communities participate directly with the federal government in the business development process which not only improves the chance of success but increases communities commitment to growth.

Most importantly, the House bill deals with the major portion of existing funding for rural development purposes, whereas the Senate is silent on this issue. Further, the reorganization of USDA to centralize the economic development activities of the department in one place need not result in major program efficiencies, but it should increase the likelihood of this happening. Moving decision making on the use of current program funding to the state level allows for better coordination of outlays between the state and federal government, but also puts the state in a position of being better able to encourage local communities to cooperate in their development programs. While the federal government conceivably could have played a stronger role on the latter point, the fact that local governments are subject to state control, combined with the difficulty associated with federal intervention in local affairs makes the states the more appropriate actor.

Since the major provisions of the two bills are not in conflict, and there are numerous common minor provisions in the two pieces of legislation, merging the two bills is not conceptually inconceivable. However, this does not mean it will be simple politically. Merging the provisions requires that the conferees, the Administration and rural interest groups recognize that combining both bills is preferable to either bill, or possibly no bill at all.

Remaining Legislative Issues

Even if the conference committee can reach a compromise acceptable to both Houses of Congress and the President that will allow new legislation adopting the best features of the two bills to become law, it is unrealistic to believe rural America's problems will be resolved. Rural development legislation has become a less important factor in the federal influence on rural areas. Even given a significant increase in funds allocated to rural development programs, the primary influence the federal government has on rural areas comes from programs and decisions that have broader effects and purpose than aiding rural America.

Questions of levels of funding of course lead to the great legislative dilemma of the difference between authorized outlays and what the appropriations committees choose to appropriate. Clearly the earliest any funds could flow for changes that require appropriations, is the next fiscal year. Even for changes which do not need appropriations, there is some question as to what happens if appropriators require that funds be used for specific purposes when authorizing language allows greater flexibility in use.

Moving to broader issues, macroeconomic policy which sets interest rates, exchange rates and the level of the deficit has a bigger impact on the condition of rural areas than does the level of funding for rural programs. The economic turmoil of rural America in the 1980s has many of its roots in the inflationary era of the 1970s, and the monetary and fiscal policies adopted in this decade. Similarly, decisions in setting health policy, made at a national level, have a great bearing on rural communities. Additional funds to help build businesses are likely to be ineffective if the community hospital just closed because it can no longer absorb the losses associated with treating medicare and medicaid patients.

Similarly, if the current round of detente continues and defence budgets fall, there will be pressure to close additional military bases. Rural communities that lose bases will experience a major economic downturn that rural development programs will be unable to alleviate.

In addition, many of the critical problems facing rural areas are not amenable to a federal solution. The education system in many rural communities is inadequate for the demands of the next decade. However, improving education is primarily a state and local issue, not a federal one. Deregulation at the federal level is also placing many transportation and telecommunication issues in state hands, and rural communities

will increasingly have to look to their state legislature for help in these areas.

While the proposed legislative changes in both the House and Senate bills are compatible with the "New Alliance" for rural development proposed by the National Governors Association, there are still a lot of issues to be worked out. A broader state role in approving projects has to be worked out; within a structure that, preserves federal responsibility for ensuring that the different parts of the country continue to make progress, and ensures that federal funds are not used to benefit one region at the expense of another.

Conclusion

At the beginning of the paper I set out four questions to be answered in the body. In conclusion let me repeat the questions and summarize the answers.

1. Why was rural development legislation successful this year and not last?

Times changed, and support in the Senate by the leadership along with the veiled promise of additional funding led to enough support to pass a bill. The current Administration did not appear as opposed in principle to the idea as did the previous one. In the Senate it was possible to link rural development legislation to another bill that had to pass. Finally, success in the Senate provided an incentive for the House to move.

2. Will there be a substantial change in Federal programs with the passage of the new legislation?

The House bill promises a more substantial change because it involves the prospect of a significant reallocation of funds whereas the Senate bill involves an incremental addition of funds. However, for the House bill to be successful, communities must be able to undertake the type of planning effort envisioned in the bill. If they can't not much will change. Combining the two bills offers the greatest promise for change, but even then the magnitude of change depends on the willingness of the Administration to implement the legislation. It is easy to make changes in appearance without making changes in substance.

3. Would rural Americans benefit from the legislative proposals?

As noted above, there are other factors that have a bigger bearing on rural America than specific pieces of rural development legislation so it would be a mistake to assume that this legislation in the absence of other changes would lead to significant improvements. At the margin rural America will benefit if more flexibility in the use of existing federal funds occurs and if additional funds for new programs become available. However, the changes are likely to impose a cost on some people. Reallocation of funds means someone loses, even if society is collectively better off.

4. Is it realistic to expect new rural development legislation in this Congress?

The postponed mark-up in the House Agriculture Committee may be an indication of the problems H.R. 3581 will face in the future. There has been no ringing endorsement of the legislation by interest groups comparable to the support the Senate bill received. Both the Administration and the National Governors Association like the basic concepts but in the face of active opposition by other rural interests the bill is likely to die. This would probably mean the end of rural development legislation in this Congress since the farm bill will occupy the legislative agenda in 1990.

Where does this leave us? It suggests that implementing the new initiatives would on balance be a good thing. Even with full funding of the various proposals, the annual cost for programs benefitting one quarter of the population is still less than the annual salary of a number of Wall Street financiers, and could help rural Americans become a more productive part of society. However, we are also left with the very distinct possibility that the difficulty of putting together a broad based coalition to support rural development will once again result in no legislative changes.

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PUBLIC AND PRIVATE PARTNERSHIP*

Terry Donahue
Mayor, City of Creston, Iowa

Where is Creston, Iowa? To tell you, I think we are in the middle of economic recovery. My purpose today is to relate the story of Creston, its growth, its pains, its plan of action. Many times persons have said that we depend wholly on the Federal Government to say, "come in, solve our problems." I know that the Governor in our State has many problems laid at his doorstep by people who say "solve them; we don't know what to do." This happens as far as city-county governments are concerned. At other times, it's, "Let the people on the street clean up the mess they created." In fact, no one person, agency or level of government can totally provide what may be needed. To understand why I believe this, I need to relate Creston's history.

Creston is now a community of 8,500 people. Our past is made from the lore and legends of a railroad moving west. Initially, the town was platted by the Burlington-Missouri River road in the 1860's. The town was incorporated in 1869. And eventually the system was acquired by the Chicago-Burlington & Quincy, which is now the Burlington-Northern Railroad, a major railroad within our Country. Creston was so named because our area is the highest point between the Mississippi and the Missouri Rivers. In the steam engine locomotive days, this was very important. Creston had railroad machine shops, offices, stockyards. We also had the second largest locomotive roundhouse in the United States. So you can see why the railroad was the major role player in the economy of our community. The railroad was healthy, it was vibrant, there were no real concerns. What could happen? Well, as with everything else, the rules gets changed, technology changes, and, therefore, you must change.

A series of events threatened our very existence. For one, the technology changed starting in the late 1950's and going into the 1960's, when railroads converted from steam to diesel. It doesn't seem like a significant move; but when you are dealing in an era of steam engines, it is. The machine shops closed, professional people left, and the machinery that we ran our community with disappeared.

The next event to have major impact was in the mid-1970's. Droughts affected both town and country. They, along with the grain embargo and other farm policies which occurred, wreaked havoc in our rural and farming area.

But in the 1980's, the full impact of the agricultural crisis hit. It strained our resources, it wreaked havoc on the agribusiness sector. Our

family farms were decimated. Industry went to a slowdown. Private businesses just dried up. And worst of all, the very fabric that made us strong was starting to disintegrate. This was the family farm. You must understand that in a farming community and in an area such as ours, when you talk about farming you talk about family. And what was occurring in the families was hostility, anger, depression, blame. That is a difficult thing to deal with. And when a community is dependent upon a single mainline type of industry, such as farming, things go well for a while, but there is a quick road to disaster when something goes awry.

When something goes wrong everyone suffers, so we in the community said now is the time to do something. We in business, industry, and government either had to make a choice of submitting to absolute complacency or to affirmative action. We also realized that real communication, not small talk, was of absolute necessity to start to break down barriers. We had to accept the fact that persons in each mode of the community had to give up portions of their private turf in order to move ahead, a very difficult thing to do.

What we hoped to do then was to instill trust -- a trust and faith in one another that we together could move ahead and make our community vibrant. A coalition of persons was formed to strengthen our local development group. This was comprised basically of business, government, and education. We created our first partnership for action called The Creston Development Company. It is comprised of persons from the professional sector, retailers, finance persons, real estate, community college persons and city government representatives. Complementing the group, we always have a good contractor so that when we start to work with individuals we can give answers on costs for modification or building costs. We also defined the duties of all members so we had the ability to negotiate factually with government people, private industry people, or retail people on an immediate basis.

Our two major goals: We wanted to diversify our business and our industry as much as possible and to provide adequate opportunity for employment both for our town people as well as the farming community.

From that point, we developed a comprehensive prospect book. Essentially it is not that difficult, and it forces a comprehensive inventory of what the community has. You have your community survey, you have what we call a community quick reference, existing industry program, tax programs, utility programs.

We then moved to the next level. We developed a video tape which was, in a sense, a community composite. Funding for this came from all sectors -- private, community college, city and county government. We even had it translated into German, Chinese, and Japanese. This was done through efforts of our State university and through an EDA grant. So there we formed a federal coalition. In developing tapes like this, you have to be careful about their content. For instance, one of the things about southwest Iowa is that we have more pheasants than you can count and you almost have to kick them off the roads at times. But when we wanted to put in a hunting scene, as far as German society is concerned, we had to cut that out. Why?

Basically because it reminded them of their border guard situation and the division then of East and West Germany. So you have to be socially and culturally conscious.

Then we worked with a utility company, Iowa Southern Utilities, and built a 40,000 square foot spec building -- concrete floor, good lighting, and by all means clean. I will explain this later on.

One of the hardest things was realistically assessing our infrastructures and what we could provide as far as quality and quantity. From this point, payoffs came domestically as well as internationally. We have been able to recruit or expand businesses, such as Welman Dynamics which is part of Fansteel Corporation, a major contributor to the defense industry and Buntamatic, the coffee makers for cafeterias and for home.

I must say that this was probably one of the best recruitments that we had because at the current time three-fourths, or approximately 300 of the 400 employees, are women. We were able to provide a subsidy income not only for the people in our community but, again, for the farm families. When it comes to the farm families, sometimes I don't think we wholly realize how important that extra income is. It has made the difference as far as make or break. We also have Getz Manufacturing, which contributes to the automotive industry; Van Mark Industries, which makes specialized machinery for food processing; and we also have the K.C. Sandwich Division, which makes all the sandwiches for K.C. convenience shops.

Then internationally there are the Gummy Bears. They are made by the Trolley Candy Company of Nuremberg, West Germany. How did they wind up in Creston, Iowa? They were exporting so much that they felt that they wanted to find a facility in the Midwest if at all possible. Events started with a simple telephone call from an attorney in New York to the Iowa Development Commission. Of course, we didn't know the company's name at that particular time. We were able to gear up, have our presentations in order, and be ready to quickly negotiate. And here is where the contractor comes in -- we had the spec building ready. So all we had to do was talk about modifications. And they could closely calculate their operating margins. They started out with 25 employees at the Gummy Bears. Within two years they were up to 125 employees. We are adding another 30,000 square feet on that building. And believe it or not, we are exporting Gummy Bears back to Germany. Again, this was a result of a coalition of people working together.

Now what I really want to talk about is infrastructure. The areas that we felt we had to pursue were water and sewer. The droughts of the mid-70's determined our course, and that was our priority. So, Twelve Mile Lake had to be pursued. Again, we had our act together. We knew what we wanted, we had the specifications that we felt we needed, and so once we recognized that we couldn't do everything and we could only go so far, then we knew that we had to look for other help. This is where the Farmers Home Administration really came in at the most significant time. The persons from the Des Moines office talked with us, helped us clarify our issues, helped us more closely define those things we wanted accomplish, and sat down with us as equals and

partners. To build a 650-acre lake and reservoir, we combined funds from the Farmers Home Administration, EDA, the State of Iowa, the Soil Conservation Service and the City of Creston. Sometimes it is difficult to get all the partners to sit down and talk with one another. But if you are committed to it, you have to do it.

The lake was built. It was put on-line approximately 3 to 4 years ago. It has 650 acre-feet of water. We have a water treatment plant that can treat and process up to 2.5 million gallons of water per day. That was a boon and a lifesaver. It also ensured our local economic development picture. Also, once the lake was built, we started working with the Southern Iowa Rural Water Association for 125 square miles of southern rural water.

Farmers Home Administration deals in infrastructures. But there are other things that FmHA has done for the community as well. They have helped provide funding through the FmHA CF loan program. Again, we combined those programs with the Community Development Block Grant and private funds to establish the Southern Iowa Residential Facilities--two group homes in our community for physically and mentally disabled persons so they don't have to stay in the institutions anymore. They can come back to the county and city where they came from. They can be made part of the citizens of our community. Sure, the employment may be menial and they may work at a sheltered workshop, but they are there and they are home with us and that means quite a bit to the families of those folks.

In addition, we also had the rural rental housing financing by Farmers Home, creating over the last 2 years 116 units of family and senior citizen housing. This certainly helped raise the quality of life in our area. Now we are working with a private investor and developer for other low and moderate income apartments to enhance the quality of life. And what is he using? Farmers Home Administration money.

In 1989, a major event of coordination, planning, development is occurring. This is the Three Mile Lake Project. The scope and reason for why we are doing this is that with the drought of 1988-89, towns were literally running out of water. Had not Twelve Mile been built and implemented, I am not sure where we would be today. The National Guard, through the efforts of the government, was hauling tankers of water to different small communities 30, 40, 50 miles away so they would have water. The wells were drying up, reservoirs were drying up; and, again folks, until you have really experienced it, you don't know how that drink of water really tastes and feels like to you when you can't have it all the time.

In southern Iowa we also have another water problem. It may rain but it is going to take a long time to build that water ground table back up. Also, the quality of water has become a major issue. In northeastern Iowa, one-fourth of the State's underground water supplies or reservoirs are contaminated by nitrates. We are facing essentially the same situation in southwestern Iowa, northwestern Iowa, southeastern Iowa, Kansas. So we

have representatives of seven counties working on the Three Mile Lake project. The committed persons to this project -- again, as I said, involving seven counties -- include Farmers Home Administration through grants and also loans (some are funded and some are still pending), SCS, EDA, Iowa Department of Natural Resources, State of Iowa Community Development Block Grant, our city waterworks program as well as other cities and communities. What this already means is that for a town such as Lenox, Iowa, 20 miles down the road, if they did not have the commitment that we would provide they would not have the factory expansion from the Pipetti Brothers in New Jersey to create almost 300 new jobs in that community. It is an egg processing plant and without water you can't run it. This is just an example of what it is going to mean as far as economic development is concerned. Without potable water, good water, our communities will cease to exist.

What does it mean for our farmers? Our community college has worked very hard in developing farm diversification programs. Right now the Campbell Soup Company, along with the local co-op, has a chicken raising program where they raise 25,000 to 30,000 chicks on 10 farms every 3 months and ship them to Campbell Soup. One of the prerequisites is good water. We have 9 to 10 of those farms already set up. Now we can take 16 or 17 more. What was just recently announced is the Southwest Iowa Feeder's Co-op, feeding cattle.

To me the role of government is helping establish lines of communication. It is not a situation where I stand in Creston and say, "You've got the money, have we got a lake for you." You can't do that. It has to be a two-way street. You have to have your facts, your goals, your directions in order before they can come down and help you coordinate what you want to do.

If you take nothing else today away from here, I just want to say that if there is no real concern, there is no real communication. If there is no communication, there can never be cooperation. If there is no cooperation or if that is absent, no commitment can ever exist. When commitment dies, so does the community.

Thank you very much.

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OUTLOOK FOR TIMBER PRODUCTS

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Few timber products are consumed by individuals in the form in which they are initially manufactured. Instead, most move to various major markets where they are remanufactured or made a part of a product that is ultimately used by individual consumers. Thus, although consumer demand is the underlying force, direct demand for timber products is largely determined by the levels of activity in their primary end-use markets.

In my talk today, I will review trends in the economy and in the major timber products markets through the third quarter of 1989 and present consensus estimates of their prospective growth in the last quarter of this year and in 1990. I will then comment on what these trends suggest as to the consumption and production of the various major timber products.

General Economic Trends

The gross national product, a measure of the Nation's total output of goods and services, and the most comprehensive indicator of total economic activity rose at an annual rate of 2.5 percent to \$4,158.1 billion (1982 dollars) in the third quarter of 1989. Although the rate of growth changed little between the second and third quarters, the economy has been generally slowing since late in 1987. With the 2.5 percent annual rates shown in the second and third quarters, growth through the first three quarters of 1989 averaged 2.9 percent, a fifth smaller than the rate in the first 9 months of 1988.

Late in the third quarter and early in the fourth, many indicators seemed to be pointing to lower rates of economic growth in the months ahead, particularly in the industrial sector. For example, manufacturing shipments, new orders for durable goods, and backlogs of unfilled orders declined in September, while business inventories were rising. Reflecting these trends, manufacturing production and industrial utilization rates declined in both September and October. Retail sales and consumer credit were slightly higher in September but dropped somewhat in October, and though personal income increased by a small amount in September, personal consumption expenditures, a major component of GNP, showed the smallest monthly gain in a year.

With these various factors in mind, analysts currently forecast that the economy will continue to grow in the fourth quarter, but likely at a somewhat slower rate than in the third. As a consequence, average 1989 GNP should amount to about \$4,140 billion (1982 dollars), 2.9 percent above the average for 1988. Most economists also expect overall growth to continue at a slower pace in 1990, especially early in the year and forecasts range from less than 2 percent to more than 3 percent. A year-to-year growth rate of about 2.0 percent would mean a further rise to an average of \$4,220 billion in 1990, and would represent the eighth year of positive growth since 1982.

Major Timber Product Market Trends

Construction of new housing units, which generally accounts for more than a third of United States annual consumption of softwood lumber and plywood and for substantial volumes of other softwood and hardwood products, has been trending downwards through much of 1989. Although there was a temporary increase at mid-year, housing starts continued to slide in August and in September dropped to the lowest level in nearly 7 years, apparently as a result of interest rate increases, declining housing unit sales, and bad weather in some parts of the country. By October, mortgage interest rates had again begun to move down somewhat, weather related building conditions had improved, and starts rebounded 12 percent to an annual rate of 1.42 million units, the highest level in almost 3 years. Despite this improvement, the number of units started through the first 10 months of the year was about 6 percent below starts in January-October 1988. The number of single-family starts was down 6.1 percent and multifamily units were 5.9 percent below year-earlier construction.

Although mortgage interest rates have fluctuated somewhat during 1989, economists generally expect moderating rates in the last months of the year and in early 1990 if the economy grows as slowly as expected. These prospective rates, in combination with the slightly increased number of housing permits issued in October, suggest a stabilization of housing activity late in the year and in the first months of 1990. Recent estimates of housing starts for 1989 fall between 1.38 and 1.44 million units, with the current consensus at about 1.41 million units--down 5 percent from the volume started in 1988. Analysts' forecasts for 1990 naturally have a somewhat wider range; however, most estimates available early in the last quarter show a probable increase to about the 1.46 million level.

Single-family units are expected to account for about 73 percent of total starts in 1989, about the same percentage as in 1988. A small increase in the relative proportion of single-family units is likely in 1990. Shipments of mobile homes, down about 6.6 percent from year-earlier levels through September, are likely to total about 200,000 units in 1989 with a small increase probable in 1990.

Repair and remodeling of residential structures, another major wood products market, apparently has slowed somewhat in 1989 after 6 years of relatively rapid growth. Through September, Bureau of the Census construction surveys show that expenditures for improvements (additions, alterations, and major

replacements) averaged about \$51.0 billion (seasonally adjusted annual rate, 1982 dollars), 1.3 percent below expenditures during the same period in 1988. In contrast, annual expenditures rose almost 8.5 percent between 1987 and 1988. Observers surmise that both upkeep and improvement expenditures could have been adversely impacted by interest rates increases during the summer and by a small drop in per capita income in the second quarter. Most agree that this segment of the construction market, though down slightly in 1989, will recover in 1990 and continue to grow in the years ahead.

Total nonresidential construction activity through the first 9 months of 1989 has been slightly weaker than during the same period in 1988. Expenditures through September averaged \$175.9 billion (seasonally adjusted annual rates, 1982 dollars), down 0.7 percent from January-September 1988. A number of things are apparently responsible for the lack of growth in 1989, including, for example, the slowing overall economy, delayed effects of declining housing construction over the past 3 years, interest rate increases early in the year, and continued high vacancy rates for office buildings, hotels, and motels in many major urban areas. Many of these factors will likely continue to negatively affect nonresidential construction in late 1989 and early 1990. As a consequence most economists expect a slight decline in nonresidential construction expenditures for all of 1989, followed by a small improvement in 1990.

The index of manufacturing production--an important indicator of the demand for pallet lumber, container board, and some grades of paper--dropped about 0.8 percent to a seasonally adjusted value of 147.6 (1977=100) in October. Although this represented the third small monthly decline in a row, much of the decline was apparently due to the California earthquake and other temporary factors, and most analysts interpreted the overall situation as a continuation of the relatively flat trend in evidence through most of the year. The October index indicated an overall increase of less than 0.3 percent since January. The indexes of production for the furniture and fixtures and paper and products industries have also shown little sustained growth in 1989.

Despite the lack of sustained growth during the year, average monthly manufacturing production through October was about 4 percent above the average for the first 10 months of 1988. Furniture and fixtures manufacture was also up about 4 percent year-over-year, while the paper and products index indicated an increase of about 1 percent. Most economists currently feel that total manufacturing output and production in many industries will continue at a relatively slow but positive pace in the months ahead, in step with prospective economic growth.

In summary, U. S. economic activity in general and many of the principal U.S. timber products markets have shown declines or somewhat lower rates of growth over the first three quarters of 1989 than in 1988. In addition, prospective trends in several of the important indicators point to continued relatively slow growth in late 1989 and early 1990. At the current time, however, most economists do not foresee a recession in 1990. The prospective improvement in housing markets in 1990 should be a positive influence on the consumption of several products.

International Markets

The United States is the world's leading importer of timber products--chiefly softwood lumber, woodpulp, and paper and board from Canada, and veneer and plywood from southeast Asia. The total value of these imports in 1988 was \$16.7 billion, about 3.8 percent of the value of all U.S. imports. In terms of roundwood equivalents (i.e., the estimated amount of wood required to produce the individual products), more than a fifth of our apparent consumption of timber products in recent years has been imported.

The United States is also a major timber products exporter, the value of which is second only to Canadian shipments in world markets. In 1988, the value of our timber products exports was \$12.8 billion--about 4.2 percent of our export total. Although we ship a wide variety of timber products to many different countries, our principal export markets are Japan for softwood logs and lumber, pulp chips, woodpulp, and paper and board products, and western Europe for lumber, plywood, woodpulp, and paper and board. In recent years, China has also become an important market for softwood logs.

According to data presented at the October meeting of the Timber Committee of the Economic Commission for Europe, economic growth in many of our major European markets has remained relatively strong in 1989, though at slightly lower levels than in 1988. Despite these trends, investment in equipment and in construction in several countries remained at high levels, although interest rate increases in the fall were expected to have some dampening effect late in the year. Exports of logs and lumber to Japan in 1989 are both sharply ahead of shipments in 1988, while there has been a large decline in logs to China.

Looking forward to 1990, the likelihood is for some slowing in the exports of most products. Our major western European trading partners expect a leveling off or some easing back in their purchases as a result of probable rising interest rates and slightly slower overall growth. Industry analysts expect that shipments to our major Pacific Rim markets also will be smaller than they were this year. Imports, particularly of those products used in housing construction, should show some increase.

Timber Products Production, Trade, and Consumption

Softwood lumber

According to data from the National Forest Products Association, softwood lumber consumption in the first 8 months of 1989 was about 1.5 percent below that in the same period in 1988. Current expectations about housing and other markets indicate the likelihood of some additional slowing in the final months of the year. Thus consumption for all of 1989 (based on data from the U.S. Bureau of the Census) is estimated at 46.5 billion board feet, 2.9 percent below consumption in 1988 and down 6.5 percent from the record 49.7 billion board feet consumed in 1987 (table 1).

**Table 1.--U.S. wood products production, consumption, and trade
(1986-88 actual, 1989-90 projections)**

Product	Year	Domestic production	Imports	Exports	Apparent consumption
Softwood lumber (billion bd. ft.)	1986	34.8	14.3	1.9	47.2
	1987	37.4	14.7	2.4	49.7
	1988	37.3	13.8	3.3	47.9
	1989	35.9	14.0	3.4	46.5
	1990	36.9	14.3	3.4	47.8
Hardwood lumber (billion bd. ft.)	1986	7.2	.3	.5	7.0
	1987	7.5	.5	.8	7.2
	1988	7.7	.4	1.3	6.8
	1989	7.0	.3	1.0	6.3
	1990	7.2	.4	1.0	6.6
Softwood plywood (billion sq. ft., 3/8-inch basis)	1986	20.4	.1	.6	19.9
	1987	22.3	.1	.8	21.7
	1988	22.1	.1	1.0	21.2
	1989	21.7	.1	1.4	20.4
	1990	22.4	.1	1.4	21.1
Hardwood plywood (billion sq.ft., 3/8-inch basis)	1986	.9	1.9	.1	2.7
	1987	.9	1.9	.1	2.8
	1988	.9	1.6	.1	2.4
	1989	.9	1.8	.1	2.6
	1990	.9	1.9	.1	2.7
Particleboard ¹ (billion sq. ft., 3/4-inch basis)	1986	4.5	.2	.1	4.6
	1987	4.7	.2	.2	4.7
	1988	4.9	.3	.3	4.9
	1989	5.0	.4	.4	5.0
	1990	5.1	.4	.4	5.1
Hardboard ² (million tons)	1986	1.8	.3	.1	2.1
	1987	1.7	.3	.1	1.9
	1988	1.6	.2	.1	1.7
	1989	1.6	.2	.2	1.7
	1990	1.7	.3	.2	1.8
Insulation board (million tons)	1986	.9	.1	(3)	1.0
	1987	.9	.1	.1	.9
	1988	.9	.1	.1	.9
	1989	.9	.1	.1	.9
	1990	.9	.1	.1	.9
Pulpwood (million cords)	1986	93.4	.6	1.9	91.8
	1987	95.9	.4	2.0	94.3
	1988	97.5	.7	2.8	95.4
	1989	101.7	.7	3.7	98.7
	1990	103.3	.7	3.9	100.1

- ¹ Includes medium density fiberboard. Imports adjusted to remove estimated waferboard shipments.
² Shipments.
³ Less than 50,000 tons.

Note: The projections shown for 1989 and 1990 are based on the trends in the major markets discussed in this paper and should not be viewed as forecasts of actual volumes. Data shown are subject to rounding.

Sources: U.S. Department of Agriculture, Forest Service estimates based on data from the U.S. Department of Commerce, American Hardboard Association, American Paper Institute, American Pulpwood Association, National Forest Products Association, National Particleboard Association, and Western Wood Products Association.

Imports, nearly all from Canada, have increased somewhat over the first 9 months of 1989. Through September, total softwood lumber imports were about 3 percent above the similar year-earlier period. Imports during the last quarter of 1989 are likely to drop to slightly lower levels given the prospective U.S. demand situation. As a result, total imports for 1989 are expected to reach 14.0 billion board feet, up about 1 percent from the volume imported in 1988.

Exports through the first 9 months of 1989 were up 5 percent from January-September 1988. Many observers feel that this trend will moderate slightly late in the year. As a consequence, exports for the year are likely to total about 3.4 billion board feet. This would be about 4 percent more than in 1988 and a record level.

Through August, U.S. production of softwood lumber was nearly 2 percent below the first 8 months in 1988 according to information from the Western Wood Products Association. With somewhat slower markets expected in the last months of the year, production for all of 1989 should amount to about 35.9 billion board feet, 3.8 percent below production in 1988. Present expectations about housing and the other important markets discussed earlier indicate probable increases in production, imports, and consumption are likely in 1990.

After rising through the first half of the year, the price of domestically produced softwood lumber has declined somewhat in recent months. The October producer price index was 129.3 (1982=100), down almost 3.7 percent from the index for July, but up about 9.3 percent from October 1988 (table 2). With the prospective slowdown in consumption in late 1989 discussed earlier, prices likely will not rise markedly until usage picks up in 1990.

Hardwood lumber

Data published by the National Forest Products Association show hardwood lumber consumption through the first 8 months of 1989 down sharply from the similar period in 1988. If manufacturing markets continue at the current slow pace in the last months of the year, consumption, based on Bureau of the Census data, is likely to drop to 6.3 billion board feet, about 7.2 percent below the 1988 total.

Hardwood lumber imports through September were almost 16 percent below those in the first 9 months of 1988 with some additional slowing expected in the last quarter. The total for the year is thus estimated at 0.3 billion board feet. Total exports for the year are expected to be 1.0 billion board feet, down from 1.3 billion in 1988.

Hardwood lumber production in 1989, based on data from the Bureau of the Census and the above estimates of consumption and trade, is projected at 7.0 billion board feet, down 8.6 percent from output in 1988. Anticipated growth in the important hardwood markets suggests that small increases in production and consumption are likely in 1990. Imports and exports also are expected to show small gains.

Table 2.--U.S. producer price indexes for selected timber products
(1982=100)

Product	Annual			October	
	1986	1987	1988	1988	1989 ¹
Softwood lumber	108.4	116.6	120.0	118.3	129.3
Hardwood lumber	118.2	126.8	131.0	128.1	128.2
Softwood plywood	109.4	109.8	109.1	109.1	138.5
Hardwood plywood ²	91.0	92.9	94.2	94.6	101.0
Particleboard ³	112.5	121.1	125.4	121.4	132.8
Hardboard	103.7	101.9	103.5	105.6	99.5

¹ Preliminary.

² Hardwood plywood and related products.

³ Platen-type (mat-formed), December 1982=100.

Source: U.S. Department of Labor, Bureau of Labor Statistics.

Hardwood lumber prices have shown little variation over the past year. The October producer price index--128.2 (1982=100)--was less than one percent below the high recorded in May and less than one percent above the average in October 1988. Because of their different market structure, prices for hardwood lumber are generally less volatile than those for softwood lumber.

Softwood Plywood

As noted earlier, new housing construction, traditionally the most important softwood plywood market, has remained below year-earlier levels through the first 10 months of 1989, and other major markets have shown only relatively slow growth. As a result, softwood plywood consumption has been somewhat weaker than in 1988. Total consumption in 1989 is expected to drop to about 20.4 billion square feet (3/8-inch basis), about 3.8 percent less than was used in 1988.

Data for the first 9 months of 1989 show softwood plywood exports nearly 40 percent above shipments during the similar period in 1988, with significantly larger shipments to nearly all of our major offshore markets. This upward trend is likely to slow somewhat late in the year and the total for 1989 is expected to be about 1.4 billion square feet. Imports are expected to amount to about 0.1 billion square feet.

With these levels of consumption and trade, softwood plywood production for 1989 is projected to decline to 21.7 billion square feet (3/8-inch basis), about 1.8 percent below output in 1988.

For 1990, with the prospective increase in new housing construction, and the relatively slow growth in other markets, total consumption is expected to increase about 3.4 percent to 21.1 billion square feet. Imports and exports also are likely to be near the volumes in 1989; and as a consequence, production should also rise.

Softwood plywood prices, as indicated by the producer price index, have been increasing in 1989, with a particularly large jump in October. The October index--138.5 (1982=100)-- indicated prices nearly 9.5 percent above those in September. Industry observers surmise that the large rise in October and smaller increase in September were largely in response to Hurricane Hugo and the California earthquake superimposed on small stocks in the distribution system. If demand increases in 1990 as outlined above, some additional rise in prices is likely.

Hardwood Plywood

Consumption of hardwood plywood in 1989 is expected to be near 2.6 billion square feet (3/8-inch basis), about 8 percent above total use in 1988. Trade data through September indicate that imports are likely to increase 12.4 percent to 1.8 billion square feet. Exports are expected to remain relatively small at about 0.1 billion. With these trends in consumption and trade, production for 1989 will total 0.9 billion square feet, about the same volume as in 1988.

Much of the hardwood plywood consumed each year is used in residential construction as well as in the manufacturing sector. As a consequence, an increase in consumption and imports is likely in 1990. Exports are expected to remain close to 0.1 billion square feet.

Hardwood plywood prices, as indicated by the producer price index, have been very slowly increasing over the past few years. Although the index for October--101.0 (1982=100)-- indicates prices about 7 percent above those in January, they are, of course, only 1 percent above the average for 1982.

Particleboard and Medium Density Fiberboard

Activity in the major manufacturing markets and shipments data from the National Particleboard Association suggest that combined consumption of particleboard and medium density fiberboard in 1989 will be close to 5.0 billion square feet, 3/4-inch basis, about 2 percent above that used in 1988. Roughly a fifth of total combined consumption is expected to be medium density fiberboard.

Data from the Bureau of the Census for the first 9 months of 1989 imply that both imports and exports will rise to about 0.4 billion square feet. With these estimates, production would amount to 5.0 billion square feet, also up 2 percent from production in 1988.

Trends in the major markets, discussed earlier, suggest that a increases in production and consumption are likely in 1990.

Hardboard and Insulation Board

Based on industry shipments through the first 7 months of the year, hardboard consumption in 1989 is estimated at about 1.7 million short tons, about 2 percent below estimated consumption in 1988. Imports are expected to total 0.2 million short tons, with exports also at about 0.2 million short tons. Production, with these estimates of consumption and trade, would amount to 1.6 million short tons, about 1 percent below production in 1988.

Markets during the first 3 quarters of 1988 indicate that insulation board consumption for the year will be near 0.9 million short tons--about 7 percent under the volume used in 1988. Imports and exports are expected to be close to 0.1 million short tons. Consequently, production is estimated at 0.9 million short tons, down about 3 percent from output in 1988.

With the prospective trends in housing and the major manufacturing markets, consumption and production of hardboard and insulation board are likely to show small increases in 1990. Imports and exports for both products will probably remain about the same as in 1989.

Pulpwood

Over the first 3 quarters of 1989, paper and paperboard production and consumption, though following a relatively flat trend, has continued at record and near-record levels, according to data from the American Paper Institute. Through September, the annual rate of total output was down only 0.2 percent from the first 10 months of 1988. As a result of these trends, pulpwood consumption was again continuing at record levels according to data from the American Pulpwood Association. Data from industry sources suggest that production may have moved back to the 1988 trend line in October and that production for the year could at least match the record set in 1988. On the basis of these trends, pulpwood consumption (roundwood and chips) in 1989 is expected to total 98.7 million cords up about 3.5 percent from the previous high recorded in 1988.

Imports of pulpwood, mostly pulpwood chips from Canada, have remained near year-earlier levels through the first 9 months of 1988, according to Bureau of the Census data. As a result, imports for the year are expected to total 0.7 million cords. Exports are estimated at 3.7 million cords, about 35 percent above exports in 1988. Most of the increase in exports will be in the form of pulpwood chips shipments to Japan.

Pulpwood production in 1989 is expected to rise to about 101.7 million cords, 4.3 percent more than in 1988, and also a new record. The prospective increase in overall economic activity suggests that the upward trend will continue in 1990, though at a somewhat slower pace than in the past few years.

Softwood Log Trade

Softwood log exports during the first 9 months of 1989 totaled 3.6 billion board feet, about the same volume shipped during January-September 1988. Exports were up to many of our major offshore markets, however, shipments to China were only a little more than a third above the year-earlier volume. As the result of some probable slowing late in the year, exports for all of 1989 have been estimated at 4.4 billion board feet, 4 percent below shipments in 1988. Industry sources indicate that the outlook for 1990 is for a continued decline to about 4.2 billion board feet.

Softwood log imports were down sharply through September and are likely to total about 25 million board feet, roughly half of the volume imported in 1988.

Hardwood Log Trade

Hardwood log exports for 1989 are estimated at 0.2 billion board feet. Although the volume is relatively small, most of the logs exported in 1989 and in recent years have been high quality oak, walnut, and other preferred species that are in short supply in the United States. Thus, these exports have been an contributing factor to the increases in stumpage and log prices for some species.

Hardwood log imports in 1989 are expected to be close to 20 million board feet, about double the volume imported in 1988.

Industrial Roundwood Summary

Given the trends in consumption, trade and production in 1989, total consumption of all industrial roundwood products (i.e., all roundwood products except fuelwood) is expected to be about 15.6 billion cubic feet, 3.1 percent below use in 1988 and 6 percent less than the record volume consumed in 1987. Production and imports will also be below year-earlier levels. Exports, however, will show a moderately large rise. Consumption, imports, and production will all increase in 1990 if the major markets follow the trends discussed earlier.

Fuelwood

Studies have shown that in the short run, fuelwood consumption largely is determined by such factors as the prices of alternate fuels and weather conditions during the heating season. Current estimates indicate the rapid growth in the consumption of fuelwood seen in the late 1970's and 1980's has slowed as the prices of fossil fuels have peaked and then declined in recent

years. Based on available data, fuelwood consumption in 1989 is estimated at about 40.5 million cords, just slightly less than estimated consumption in 1988. An additional small decline is possible in 1990, depending on the weather, and if the prices of alternate fuels do not increase appreciably.

Much of the wood used for domestic heating and cooking in the United States is cut by the consumers themselves from trees in urban areas, fence rows, dead forest trees, and other sources not normally drawn upon for industrial timber products. Most of that used by forest industries comes from utilization of logging residues and mill byproducts.

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TIMBER DEMANDS AND SUPPLIES TO THE YEAR 2000 AND BEYOND

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Periodically, the U.S. Forest Service compiles a long-term outlook for the timber demand/supply situation. There is a long history for our doing this type of analysis--going back over 100 years. Since 1974, these timber analyses have been tied to legislation--the Renewable Resources Planning Act of 1974 and the National Forest Management Act of 1976. The reports have come to be known as the RPA Timber Assessments. The 1989 RPA Timber Assessment will soon go to press and much of my presentation is based on the findings in this report. The 1989 RPA Timber Assessment builds on another report which is probably more familiar to those of you from the South. The South's Fourth Forest was a major effort to study the timber supply situation in the South.

Our expectations about the future are strongly influenced by past trends. Especially important are trends in timber inventory, technology, and international trade.

Timber Inventory

Timber inventory data in the Assessment show that for the nation as a whole, we are in pretty good shape for timber supply. The growth/removals ratio is 1.37 for all species, 1.90 for hardwoods and 1.13 for softwoods. We are still growing more timber than we are cutting despite the fact that annual harvest has doubled since the 1950's.

The supply situation varies around the country. In the North, the growth/removal ratios are very high, indicating continued build up in growing stock volume. These simple ratios do not tell the whole story on timber supply, of course. In the North, availability of timber for harvest on private lands and local control of land use continue to affect the timber supply outlook.

In the South, the growth/removals ratio for softwoods is declining and

nearing 1.00. In the South, there are local situations where softwood harvest exceeds growth and there are developing hardwood supply shortages in a few situations. The timber supply outlook for the South depends on management, especially regeneration and planting of softwoods. To expand, or in some situations, to even maintain existing capacity, the South will have to manage timberland for more growth.

The Rocky Mountain region has had a growth removal balance greater than 1.00 for a long time. Inventories have increased slowly because many of the stands are old, mortality is high, and net annual growth is low.

The timber supply situation on the West Coast is in transition. Much of the old growth on private lands has been harvested. As the second growth comes on line, it is going into a different product mix--more framing lumber and fewer large beams, for example. The timber supply situation on Federal lands in the West depends on how a number of issues work themselves out. The northern spotted owl, old growth, below cost timber programs, and harvesting in roadless areas are four of the more important issues affecting the timber supply outlook. The timber program on the Tongass National Forest in Alaska has been debated annually in Congress in recent years.

Of these issues, habitat for the northern Spotted Owl is of the most immediate concern, mainly for the Pacific Northwest region, and especially for western Washington and western Oregon. As required by law, the Forest Service has developed plans for the management of National Forests in this region and allowances have been made for habitat for the owl. If these plans are implemented, a harvest level of 4.5 billion board feet can be sustained. If the owl is listed as threatened and/or endangered and requires a recovery plan, the sustainable harvest will be 3.0 billion board feet. The short-run effect on volume could be as much as a 50 percent reduction in volume. The Department of Interior is responsible for the process leading up to a decision on listing of the owl and the process could take over a year.

Another timber supply issue in Washington and Oregon is softwood log exports. This issue has been around for over 20 years. With the Peoples Republic of China in the market, export volume exceeded 4 billion board feet for the first time last year. There are strong arguments pro and con on the export issue. Landowners are generally in favor of exports because they increase timber prices. Mill owners who do not have their own timber holdings are against exports because they increase log prices. Taken together with the owl and other issues on Federal lands, it adds up to much uncertainty about future timber supply in the Northwest.

Technology

The United States has doubled timber harvest in the past 40 years and still managed to build inventories. This speaks well for the productivity of our

forest land, but technology had a lot to do with it. Utilization improved in the woods--less logging residue is left after harvesting. Utilization improved in mills--more lumber and plywood is being recovered from each log processed, and more hardwood is going into the pulp mix. New products were developed. First softwood plywood substituted for softwood lumber and then OSB waferboard took market share away from softwood plywood in the late 1970's and 1980's. Laminated beams have found a market and will become more important as the supply of large trees dwindles.

The track record of our industry for the past forty years shows that technology can make a difference in how we view timber supply--aspen was considered a weed species until OSB/waferboard came along. Thus, technology is a key factor to consider in developing an outlook for the future.

International Trade

Another key development in the U.S. timber demand/supply situation was increased market share by the Canadians for softwood lumber. When The Interior of British Columbia was opened for development in the late 1960's and 1970's, billions of board feet of lumber processing capacity were put in place. The Canadians' market share continued to grow through the depressed U.S. market of the early 1980's and reached as high as one-third. The U.S. industry was successful in getting relief through the Memorandum of Understanding with Canada. This agreement provides that Canada will take steps to either collect a 15-percent duty on most exports of softwood lumber to the United States or increase fees for rights to harvest timber and otherwise increase costs to the Canadian industry. British Columbia has implemented full replacement measures for the 15-percent payment and Quebec partial replacement measures.

The timber supply situation in Canada has an obvious effect on the U.S. outlook. Canada has been unable to develop and implement any nation-wide analysis for timber supply. Without this national overview, there is room for disagreement about future Canadian supply prospects. There is undoubtedly overcutting in some local areas, and there are places for expansion such as in Alberta. I think most Canadians would agree that nationally, there is enough timber to support current harvest rates for a long time. They may be getting close to a ceiling on supply, but throw in hardwoods and land now considered inaccessible and there is every reason to believe that Canada will continue to be a major factor in the U.S. market for the foreseeable future.

The Free Trade Agreement with Canada does not affect the Memorandum of Understanding on softwood lumber. The Agreement will lower tariffs on some paper and paperboard products and there may be some indirect effects on forest products such as cheap hydro power from Quebec.

The combination of Canadian imports and technology did much to keep a lid on softwood lumber and plywood prices in the 1980's. Starting in 1983 and ending in 1987, we had the strongest market ever recorded, but after taking into account inflation, softwood lumber prices were near their level in 1967.

Imports from other countries have never been so visible and subject to controversy as imports from Canada. In Southeast Asia, first the Philippines and then Indonesia banned log exports. This shifted log processing around and the source of much of our tropical veneers and hardwoods. Imports of tropical logs has never been big in the United States and there is little information on them.

Tropical deforestation, cut and burn agriculture, and global warming have all been thrown into the notion that something should be done about the harvest of the tropical rainforest. One proposal would have importing countries levy a tax on imports to be rebated back to exporting countries for forest management. Not all exporting countries want this kind of help--some resent the idea that importing countries think that exporters cannot manage their own resources. There are other points that make the idea of an import duty less feasible. It is trade restrictive and would probably violate existing agreements in GATT, for example. Pressures will not go away to do something and this is yet another source of uncertainty about future prospects.

The trees are in the ground to make Chile and New Zealand major suppliers to World softwood markets. Acceptance of radiata pine in World markets may take awhile, but the volumes are huge and will come on line about the turn of the century.

Except for softwood logs and paperboard in some markets, the United States has never been a World power in exports of forest products. Market development work of the Foreign Agricultural Service is paying off with increased exports of hardwoods, but major growth of U.S. exports of processed forest products will take years. There are reasons for this--the U.S. domestic market has been one of the best around, language is a real problem, and tariff and nontariff trade barriers affect some markets. There is little basis for expecting this situation to change in the future.

THE U.S. OUTLOOK

Demand

There is every reason to expect that the U.S. population and economy will continue to grow and this means increased demands for all timber products. For example, population in 2040 will be some 330 million people--37 percent more than today. They will all need housing, newspapers, and the other forest products that go with daily living.

Our projections indicate that the demand for fiber-based products will grow faster than for solid wood products. For example, the pulp industry currently accounts for about one-third of wood consumption and by 2040, we project it will account for more than 40 percent.

If we add up all of the demands for forest products and translate them into roundwood equivalents, the total demand for wood in the United States will increase 50 percent--35 percent for softwoods and 79 percent for hardwoods. Most, but not all of this demand will be met by domestic markets. We project that the United States will continue to be a net importer of timber products in the future. Net imports--imports minus exports--are currently 13 percent of our current consumption.

Supply

There is little doubt that demands for forest products will grow in the future--more people and a good economy means higher demands. Whether it is for lumber or a particular type of panel or a particular grade of paper is problematic--technology keeps changing the specifics of demand. For example, where will the FAX paper come from in the future?

Supply is less certain. In the North, the trees are in the ground that constitute the region's timber supplies for the next several decades. We project that timber harvest in the North will increase in the future--the timber inventory is there to support increased harvest. It may be an even bigger increase than we projected, depending on how supplies unfold in the South and West. Significant increases in the use of northern hardwoods would require major investments in technology development and application.

The South is at the margin for softwood supply. To harvest more, the region will have to grow more. The available information on tree planting and management activities all indicate that collectively, landowners in this region are taking the necessary steps to grow the wood needed to maintain and even expand harvest levels. We developed our assumptions about future management in concert with key members of the forestry profession in the South. If our assumptions are realized, the South will have softwood timber for industry expansion. For example, we project that the South will have some 50 million acres of pine plantations in 2040 compared with 20 million acres today. Timber supply will probably always be a concern in this region. Economic opportunities for forest management and short rotations give this region options for dealing with timber supply that are not shared by the North and the West.

In the West, we assume that National Forests will offer for sale the volume of timber determined in Forest plans. The owl could change that volume or some other issue may affect it. Today, the National Forests account for 18 percent of the softwood timber harvested in the United States. If the

Forest plans are implemented, the percentage will be 17 percent in 2040.

We assume for the Pacific Northwest that forest industry lands will be managed intensively in the future and that other private lands will be managed as indicated by our latest inventory data. These assumptions and trends indicate that harvest on private lands in the Pacific Northwest cannot be maintained in the short-term, but could rebound to current levels after the turn of the century. The amount of the short-term decline is problematic, but may be less than 10 percent.

If we add together the projected supplies for the three regions, total U.S. harvest is projected to increase 50 percent by 2040--35 percent for softwoods and 79 percent for hardwoods. To get this kind of supply increase, prices will have to increase. After the plantations in the South and the Pacific Northwest come on line, prices are projected to level out.

Emerging Issues

There are two issues that are emerging that could have a lot to do with the future timber supply/demand situation in the United States--recycling and global warming. Landfill space in the Northeast will likely be gone in 10 years, and no one wants a new one in their back yard. There are technical problems with recycling some papers such as print outs from laser printers. In our projections, we assume recycling will increase some, but there is potential for mandated recycling that would substitute directly for wood used in the pulp industry. A plus for timber supply, but a challenge for the pulp industry.

The consequences of global warming could go several ways from a timber supply standpoint. All we know for sure is that the concentration of carbon dioxide in the air is increasing. If unchecked, this could lead to global warming. Beyond that, we are in uncharted territory. If the warming is with adequate moisture, for example, it may be a plus for tree growth; if not, a negative. Planting trees may be the answer to global warming, but it would take a lot of trees to make a difference. A plus for timber supply, but a negative for landowners trying to grow wood for profit.

Summary

Over-all this assessment of long-term timber demand and supply is an optimistic one. It assumes:

- o that technology will continue to give us options to use the timber supply we have available;
- o that private landowners will make the investments needed to keep timber supply in line with demand;

- o that private landowners will make available timber for harvest, and
- o that Forest plans will be implemented as proposed.

We have been doing these types of assessments for awhile and we have made projections under differing sets of assumptions. Changes in assumptions change the specifics of timber supply and demand projections, but not the overall findings.

The decade of the 1980's has been one of tremendous changes for the U.S. timber industries. There have been changes in resource issues--For example, threatened and endangered species and global warming may force changes in the way resources are managed. Of all the changes that have occurred in the 1980's, structural panel and composite lumber technology may turn out to be the most important ones for the timber industry. They affect how we manage the resource and how we view product markets.



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

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OUTLOOK FOR INTERNATIONAL TRADE IN SOLID WOOD PRODUCTS

Factors Influencing Competitiveness in the 90's

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Vice President, International Trade
National Forest Products Association

I am honored by this opportunity to speak at the Annual Agricultural Outlook Conference this year. USDA's voice on issues facing the wood products industry and your support in the international arena is essential to keep our industry competitive. You are perhaps at the eye of the storm over control of the use of our resources, and your FAS partnership with the industry for international market development is becoming increasingly important to these considerations. I am grateful for the opportunity to discuss these concerns with you today.

The forest products industry is faced with problems which may not be new, but which have grown to the point that they demand that we seek new and creative ways to manage the increasing constraints on our timber resources, that we find new approaches to manufacturing and marketing, and that we develop new ways to communicate the facts about the wood products industry in order to change the ways in which the public perceives our industry. Today I would like to discuss how international markets can be an important part of the solution to these problems.

Clearly the major danger to our industry today is increasingly constrained resources, a problem which is aggravated by public perceptions of our export trade portfolio, which is weighted towards raw materials and primary products, especially to markets in the Pacific Rim.

Nevertheless, these export markets offer the biggest potential for gains in value added products to keep our industry vigorous, healthy, and competitive. What I want to proposed to you today is that the problem is a complicated one, caused by an interlocking

net of foreign tariff and non tariff barriers to further processed value added products that prevent these products from entering the foreign market place. It is very unlikely that attempts to resolve this problem through protectionism, restraints on trade, or other simplistic approaches will yield good results.

What can we do to make these markets part of the solution, rather than part of the problem? We can craft an export strategy that balances our trade portfolio by increasing market penetration for further processed wood products.

As things stand today, two obstacles block our way:

1. lack of foreign buyer's and user's knowledge of the U.S. solid wood industry and its wide range of products, especially in the area of the technical innovations in the use of advanced wood products and systems;
2. foreign trade barriers in further processed value added products.

Our solutions to these problems are:

1. vigorous market development;
2. trade barrier reduction through vigorous trade negotiations; and,
3. an expanded use of export financing.

This is the job that faces us in the 1990's, and comprises our industry's export strategy.

Market development, trade barrier reduction and export financing give our industry an opportunity to increase profitability and protect against domestic downturns by expanding international markets. The industry projects only moderate trend growth of domestic markets in the future in contrast to dramatic growth of markets offshore. The industry's resource base, productivity, and competitiveness give it the capacity to successfully take advantage of overseas markets of opportunity, thereby enhancing correction of the U.S. trade deficits, and bolstering the competitiveness of domestic industries, if, and I emphasize, if trade barriers are removed.

The United States continued to be a net exporter of wood products in 1989, bucking the overall trend in the stubborn U.S. trade deficit. Wood exports were valued at \$5.3 billion in 1988, exceeding imports by \$100 million. This was the first time since 1980 that U.S. solid wood exports were higher than imports. Last

year's export performance also represented the second consecutive record-breaking year for U.S. lumber, panel, and log exports. The upward trend is continuing in 1989, with exports running 12% ahead of the 1988 level.

Looking to the future, the strongest economic growth is projected in the Pacific Rim over the next five years. In the Pacific Rim, per capita consumption of wood is 1/10 that of U.S.; there are severe shortages of domestic timber supplies; and critical housing shortages. On the other hand, projected GNP growth in many countries averages 3-4 times that of western nations. Because of these factors, we believe that the Pacific Rim offers a much larger potential for increased sales of U.S. solid wood products. If these markets were free of trade barriers, annual exports could increase dramatically, rising by at least an additional \$2 billion per year by 1994.

To complete the brief overview lets take a look at the importance of Pacific Rim markets, and specifically Japan, to U.S. exporters. Over the last four years, 60% of all U.S. wood products exports went to the Pacific Rim, primarily to five countries: Japan, Korea, China, Taiwan, and Australia. And 43% of all U.S. exports to the world went to Japan, in contrast to Europe, which received about 20% or \$935 million.

Let us now turn to the export strategy. The international programs of the wood products industry fall into three major interrelated groupings which make up our export strategy. These are: market development, trade policy, and export financing.

The U.S. has the most highly developed technology in the world for the production and utilization of wood products. Many overseas markets in different stages of development are beginning to consider U.S. solid wood products and engineered systems for the first time; a few examples are: Korea, China, Taiwan, Iraq, Algeria, and Latin America. Because these countries are unfamiliar with U.S. products, we must educate buyers, specifiers and end users about our products, how they are used, how our marketing system works, and about the stability of our long term supply capability.

In developed markets like Japan, the EC, and Australia, continuing promotion and trade servicing activities are necessary to maintain and increase market share for U.S. products.

To answer these needs, a decade ago NFPA teamed up with the USDA's Foreign Agricultural Service in a market development program. The Market Development Program was initially funded by

FAS at \$6,500. Today the program has matured and is supported by \$2.8 million in government funds which, when matched by industry contributions, totals \$6.3 million. With activities in about 30 countries, Europe accounts for 57 percent of the program, the Pacific Rim 29 percent, South America and the Caribbean 12 percent, while 2 percent goes to the Mid-East. The program is roughly divided between softwood panels and lumber, with about 20 percent for hardwood products, and has grown to include more than 20 regional and product associations. The new Targeted Export Assistance program has brought a dramatic increase in funds available for overseas promotion. To date, the industry has received \$33 million in TEA funding which is being used to offset unfair trade practices in all of our major markets.

The Market Development Program was one of the keys that reversed the decline in exports which began in the early 1980's, and bottomed out at \$2.7 billion in 1984 and 1985. During this period, our industry/government team began to promote wood products overseas. As the Market Development Program gained momentum, export recovery took place world wide: in three short years doubling from \$2.7 billion in 1985 to \$5.3 billion in 1988. Wherever we conducted activities we got results, as exports have risen to new records.

In spite of these market development programs, success in overseas markets has not reached its potential because of the onerous trade barriers that face our industry world wide. That brings us to the second prong of the export strategy, trade policy, which must be closely linked to market development. Government efforts to reduce trade barriers have a much greater chance of success if supported by a positive and highly visible promotion program, especially if such a program is supported by the foreign domestic industry.

The U.S. forest industry faces enormous barriers in markets around the world, yet wood products exporters of other countries confront virtually no obstacles to selling their products in the United States. Tariffs, subsidies, restrictive building codes, import quotas, licensing, and many other barriers obstruct sales of U.S. products overseas. Eliminating these barriers is probably the most important responsibility area that NFPA has in the international arena: expanding markets by reducing ways in which foreign governments prevent our products from entering their markets.

To assist our government in negotiating the reduction of trade barriers for wood products through both bilateral and multilateral trade negotiations, NFPA has accomplished several important tasks so far this year: first, an industry wide policy on trade negotiations which lays out our trade policy objectives; second,

a data bank of tariffs and non-tariff barriers to wood products in more than 30 countries; third, proactive participation in the GATT multilateral trade negotiations, which has placed an extensive list of wood products on request lists tabled in Geneva; fourth, a comprehensive plan to counteract possible barriers to wood products that may arise in Europe as a result of the EC-92 single market initiative; and fifth, vigorous involvement in bilateral trade negotiations in the Pacific Rim including the Super 301 and Structural Impediment Initiatives which aim to gain dramatically increased market access for U.S. wood products in Japan.

The third prong of the export strategy is export financing. USDA's Commodity Credit Corporation provides credit guarantees to a group of selected countries, allowing U.S. exporters to receive payment upon shipment, while the buyer gets financing for one or two years.

The export financing program has been very successful in opening markets in a few countries that would not normally purchase U.S. products. For example, Iraq had never purchased more than \$1 million of U.S. solid wood products in any year. In FY1987, export financing triggered sales of \$18 million; additional financing in FY1988 brought exports to \$43 million. FY1989 sales have reached nearly \$161 million. Because of export financing, Iraq has become our eighth largest market for softwood lumber.

Financing available for all agricultural products exceeds \$5 billion annually. At the present time however, only \$302 million in GSM-102 financing is used for solid wood products. Our industry has strongly recommended that this amount be increased by making wood products eligible for the full range of USDA export financing, and NFPA successfully lobbied to have mandating language placed in the 1988 Omnibus Trade Bill. Funding, however, has been blocked in the government interagency process, primarily by the Department of Treasury, and the OMB. Full access for all of USDA's export financing program could mean some \$500 to \$700 million in new sales for U.S. wood products.

I think that you can see how the elements in this integrated strategy work:

- o market development services and expands markets and provides the high visibility necessary to invigorate trade negotiations and move the trade policy agenda, with our own as well as with foreign governments;
- o trade policy opens markets by reducing trade barriers;
- o and export financing helps fuel exports to take advantage of the interest generated by market development, and the market access gained through trade negotiations.

For the year ahead, NFPA projects that U.S. exports of solid wood products will grow another 10 to 15 percent. Expanding export trade, coupled with stable or declining imports, will maintain the U.S. position as a net exporter of wood products. A number of assumptions support this scenario:

- The value of the dollar remains at current levels vis-a-vis the currencies of major trading partners.
- Timber from tropical countries becomes increasingly constrained because of environmental pressure or simply, inventory shortfalls. Thus, the U.S. supplies an increasing share of the world market.
- The U.S. industry, through its associations, continues to support aggressive market development overseas and successfully seeks reductions in trade barriers which discriminate against U.S. species and products.
- The economies in the Pacific Rim and in Europe continue to grow, spurring the demand for construction and other wood-related uses.

Before I close I would like to discuss one of the most onerous foreign trade barriers we face, a barrier which is little known, and which must be understood if we are to eliminate the real problem that causes the trade portfolio in wood products to be imbalanced, and prevents our value added products from penetrating foreign markets. A thorough comprehension of this barrier is necessary if we are to arrive at a correct method to make export markets work for us.

The primary practice being cited by our industry for the multilateral trade negotiations is tariff escalation, which causes unreasonably high effective rates of protection.

Tariff escalation occurs when low or non-existent tariffs on raw materials are combined with high tariffs on further processed products. In most countries that are, or could be, markets for U.S. wood products, the tariff structure for Harmonized System Chapter 44 (wood products) itself, as distinct from the nominal tariff on each product is intended to impede imports of further processed products to protect uncompetitive foreign industries. Because of tariff escalation, the effective rate of protection for their wood products producers is significantly higher than the nominal tariffs. This occurs because wood processors in countries with tariff escalation can import raw materials without a tariff and add their own value, whereas high tariffs are applied to both

the value added and the raw material portions of value-added imports. Thus, the tariff structure itself acts as a major non-tariff barrier and distortion to trade.

This imposes real costs on the U.S. industry and results in serious lost opportunities. A few of many examples are Japan and Korea, with 0 percent and 2 percent tariffs on raw materials, respectively, with up to 20 percent tariffs on further processed products, and with a resulting effective rates of protection often more than twice the nominal tariff. This pattern is reflected in many countries, some with much higher protection.

The U.S. wood products industry is deeply disturbed by the high tariffs and significant non-tariff barriers which face its products throughout the world. Tariffs are often the highest in some of the most developed countries, and because these tariffs are so high for wood products, they totally preclude America's ability to compete. By comparison, U.S. wood products tariffs are generally low or non-existent. The recommended U.S. strategy to remove the trade distorting effects from the structure of tariff schedules is to seek a commitment from these countries to completely eliminate their tariffs on further processed wood products.

You can see that tariff escalation is a primary barrier that acts to keep the U.S. exports unbalanced in favor of raw materials. It is barriers such as this which must be addressed if we are to help correct the problems facing our industry which I mentioned in my opening remarks by making international markets part of the solution, rather than part of the problem.

The United States is increasing its exports of wood products by being the world's low cost producer. A combination of high productivity and comparatively low manufacturing costs means that U.S. sawn and processed products are extremely competitive on the world market. The U.S. industry has the competitive edge to take advantage of any export opportunities created by government efforts to negotiate the removal of trade barriers.

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OUTLOOK FOR TOBACCO
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The second half of the 1980's decade has been a transition period for the tobacco industry. Production has been held below pre-1986 levels while surplus stocks have been virtually depleted. The industry faces continued declines in U.S. consumption of most tobacco products, heightened antismoking activity, a greater number of more stringent restrictions on tobacco use and higher taxes. Still, buoyed by legislation enacted in 1986 that significantly changed the quota setting procedure, price support levels, and no-net-cost assessments for burley and flue-cured tobacco, the outlook for tobacco improved from 1986 to 1989. During this period, supply and demand came into balance, cigarette production rose in 1987 and 1988 because of hiked exports, and domestic leaf use rose.

Looking ahead two to five years, the outlook picture becomes clouded and there are signs the optimistic era may fade. Cigarette production is down in 1989 and further declines are likely in prospect because domestic consumption is falling more rapidly than added production needed for larger exports. As cigarette manufacturers annually assess their needs two to three years hence, they are likely facing smaller and smaller cigarette demand. Leaf exports may rise, but they continue to face obstacles that probably cannot offset the decline in domestic use.

The U.S. tobacco outlook for 1989/90 is highlighted by sufficient supplies overall, but shortages of some grades of tobacco have developed. Compared with a year earlier, U.S. flue-cured prices are higher and burley prices could increase. Prices are higher this year because support levels rose, the crop is of relatively good quality despite too much moisture in some areas, and supplies are tightening. After declining in 1988/89, use may rise a little in 1989/90. U.S. production in 1989 is up about 7 percent from last year. However, even with larger production lower carryin stocks reduced supplies about 2 percent to 4 billion pounds, with decreases in nearly every type.

The size of the 1990 crop will depend in part on USDA's decisions on quotas, which must be made by December 15 for flue-cured, February 1 for burley, and March 1 for other kinds. The shortening supply and continuing underproduction of burley suggests that its basic quota might be raised. For flue-cured, lower carryin reduced supplies about 2 percent and supply and demand are about in line. The flue-cured quota may not change much, although the formula requires an increase in stabilization holdings. However, the key for both flue-cured and burley is the level of manufacturers' buying intentions. Effective quotas could rise for both kinds.

Production of all tobacco may increase a little next year if yields are average. Prices in 1990 are difficult to predict, but depend heavily on the quality of the crop and whether the decline in domestic cigarette consumption moderates.

U.S. Cigarette Sales Declining, Exports Up

Cigarettes are the dominant product of the tobacco industry in the United States and most other countries. Despite an increase in exports, U.S. output may fall to 685 billion pieces this year, about 10 billion below 1988. However, U.S. cigarette consumption may fall about 3-1/2 percent this year. Consumption per person in the United States 18 years and older may drop by 160 cigarettes (8 packs of 20) from 3,096 to 2,936. This would be the lowest since 1942 and 32 percent below the 1963 peak. During the 1970's cigarette smokers shifted toward low-tar brands. However, there has been a reversal since 1981. From 1981 to 1985 the low-tar proportion (15 milligrams of tar or less) fell, but it rose for three consecutive years to about 56 percent in 1988 where it may remain this year.

Despite an increase in the smoking age population, total consumption of cigarettes is likely to decline again in 1990 and per capita consumption is also expected to decline. Price hikes because of increased manufacturers' costs and to maintain or enhance profits together with tax increases are primary among reasons for the expected decline in both total and per capita consumption. The Federal excise tax has remained at 16 cents a pack of 20 since 1983, but 15 States raised taxes an average of 8 cents a pack in 1989. State taxes now vary from 2 cents a pack in North Carolina to 40 cents a pack in Connecticut. Twelve States now levy excise taxes of 30 cents a pack or more. The combined city and state tax is 53 cents in Chicago, Illinois. Further state tax increases will occur in 1990.

Wholesale cigarette prices rose in December 1988 and again in June this year. For the last 7 years manufacturers' have raised wholesale prices 3 to 6 percent at about 6-month intervals (they rose about 10 percent during the past year). Retail prices have risen 6 to 13 percent a year and at a faster rate than overall consumer prices. As prices have risen, sales of generic and value-priced cigarettes (priced 15 to 35 percent lower than standard brands) have risen and now account for over a tenth of U.S. cigarette sales.

Antismoking activity, including legislation, continues to affect the industry. Forty-two States either prohibit smoking in certain places or segregate smokers and nonsmokers. Fourteen States regulate smoking in the workplace of both private and government employees, and 27 States regulate smoking in government workplaces. The U.S. General Services Administration (GSA) has implemented stringent smoking restrictions in buildings it owns and leases. Also, a large number of towns and cities have smoking restrictions. The U.S. Department of Health and Human Services and voluntary health agencies have stepped up efforts to discourage smoking. The cumulative effect of publicity and ordinances on smoking is uncertain, although it almost surely accounts for some of the downward trend in per capita consumption.

A House-Senate conference committee agreed in mid-October to ban smoking on all continental U.S. airline flights and on all flights to and from Hawaii and Alaska that last six hours or less. The provision was a compromise between the Senate, which sought a permanent ban on all U.S. flights, and the House,

which preferred making permanent the current two-hour restrictions. The full House and Senate must approve the legislation before it is sent to the President for his signature.

A number of bills, besides those limiting airline smoking, have been introduced in the 101st session of Congress that could affect cigarette smoking. Most are bills that were first introduced in previous sessions. They include: 1) increasing the Federal excise tax on cigarettes; 2) banning all cigarette advertising; 3) eliminating cigarette advertising as a deductible business expense; and 4) adding another warning label to the four currently rotated on cigarette packages indicating the addictive nature of nicotine.

Changes in Tobacco Per Cigarette Affect Total Use

Tobacco use in cigarettes remained relatively constant during the 1970's and in 1980 and 1981, despite the gain in cigarette output. For many years, manufacturers could economize in leaf use as they shifted to filtertip brands and used the whole leaf. Later, manufacturers began using various leaf expansion processes and in recent years have used more imported tobacco to stabilize costs. With cigarette production declines from 1981 to 1986, total tobacco use declined, but hikes in production in 1987 and 1988 boosted leaf use.

U.S. cigarette manufacturers used an estimated 1,207 million pounds of tobacco (unstemmed processing weight) in cigarettes in 1988. This was about 2 percent above 1987 as total cigarette production rose and leaf use per cigarette was up a little. This calendar year, with cigarette output declining perhaps 1 or 2 percent, manufacturers may reduce their total leaf use.

Manufacturers used an estimated 1.74 pounds of tobacco (unstemmed processing weight) per 1,000 cigarettes produced in 1988, about 1 percent above a year earlier, but considerably below the levels of 15 to 20 years ago. Domestic flue-cured accounts for about 35 percent, burley 30 percent, and Maryland 2 percent. Foreign grown was 33 percent; fifteen years earlier it was 15 percent.

Consumption of Other Products Mixed

Consumption of large cigars will likely decline about 1 percent to 2.5 billion in 1989. Production of little cigars--less than 3 pounds per 1,000--may decline after rising the last two years. Large cigar consumption in 1989 is expected to continue the decline that started in 1970.

Smoking tobacco consumption is estimated to fall to 19 million pounds in 1989, about 6 percent below the previous year. Consumption of chewing tobacco has likely fallen. Both smoking and chewing consumption are likely to fall again in 1990.

Consumption of chewing tobacco probably continues to be hurt by price hikes, publicity against smokeless products, and legislation enacted in the mid-1980's. The legislation requires rotating warning labels on product packages, a ban on radio and television advertising, and imposes a Federal excise tax on chewing tobacco.

Snuff consumption may have risen in 1989. An increase in moist consumption is more than offsetting a decline in dry snuff. Snuff consumption may rise again in 1990.

The factors listed above for chewing tobacco also apply to snuff, but after falling for two years, snuff consumption is rebounding. The hike in snuff use in 1988 and 1989 may be the result of consumers substituting snuff for smoking as the number of restrictions on smoking grows, high employment in industries where workers typically use smokeless tobacco, effective industry promotion of snuff products, and the waning of the impact of warning levels, tax hikes, and antismokeless tobacco use publicity.

World Situation

World tobacco production in 1989 is estimated at 15.9 billion pounds (farm sales weight), up 7 percent from 1988. The larger 1989 production is mainly due to hikes in the United States, Brazil, Malawi, Zimbabwe, China, and India. Production may be lower in Turkey, Mexico, Japan, and South Korea.

Of the cigarette types compared with 1988, production of flue-cured is higher in most of the major producing countries; the United States, China, India, Brazil, and Zimbabwe. Burley production is up in the United States, Brazil, Italy, and Malawi, but down in Mexico. Oriental production is down in Turkey, but up in Bulgaria, Greece, and Yugoslavia.

Production of other types is mixed. Production of dark fire-cured is about unchanged in 1989 whereas production of dark air and sun-cured and dark air-cured cigar tobacco may be up.

World cigarette production in 1988 reached 5.25 trillion, or 2-1/2 percent above a year earlier. Although consumption is stagnant or declining in the United States, Western Europe, Canada, and Japan, increased consumption in China will keep annual production changes positive for the world. In 1988, China's cigarette production was 1.53 trillion cigarettes, 6 percent above the year earlier.

Despite China's continued annual growth, stagnant consumption in the industrialized nations will likely slow the increase in cigarette output in future years.

World leaf exports during 1988 rose 7 percent to 3.3 billion pounds. Leaf exports in 1989 are expected to rise further. U.S. leaf exports were up 12 percent in 1988. The hike in exports in 1988 resulted from shipments to Egypt and Taiwan that had been delayed from 1987, rebuilding of stocks in some countries, and the better quality 1987 crop. U.S. leaf exports through September are below last year; but calendar 1989 exports may exceed those of last season. Zimbabwe also may export more tobacco in 1989 and Brazil may maintain the higher level of exports attained last year.

U.S. Tobacco Crop Larger

Tobacco production is up this year because of larger acreage; yields are lower. With higher support prices and stronger demand, flue-cured auction prices are above a year earlier. Flue-cured cash receipts from the 1989 crop

were up about 9 percent. Production costs were higher, but the no-net-cost assessment charged producers was unchanged at 1 cent (excluding the .12 cent budget deficit assessment which was slightly lower).

As of November 1, the tobacco crop was forecast at 1.47 billion pounds, up 7 percent from a year earlier. Total supplies for the 1989/90 marketing year were down about 2 percent as reduced carryin more than offset increased production.

Price supports for all kinds of tobacco are higher this season. Burley auctions opened November 20. Prices this season are averaging above a year earlier. Cash receipts from the 1989 burley crop may increase 15 to 20 percent.

As of October 1 this year, grower cooperatives held about 540 million pounds of tobacco (farm sales weight), down about 31 percent or 233 million pounds from a year earlier. Unsold loan stocks of about 310 million pounds on October 1 were down about 40 percent from a year earlier. The reduction came about because of special ("buyout") sales authorized by 1986 tobacco legislation, tightening supplies, and lower takings of burley and flue-cured by cooperatives in recent seasons.

Under buyout provisions, manufacturers agreed to buy approximately 584 million pounds (farm sales-weight) of 1976-84 flue-cured tobacco over an eight year period and about 308 million pounds of burley (farm sales-weight) over a five year period. The buyout is well ahead of schedule with about 82 percent of the flue-cured and 89 percent of the burley purchased within the first 3-1/2 years of the selling period.

The flue-cured auction season ended on November 9 with prices averaging \$1.67 a pound, about 6 cents higher than last year. About 28-1/2 million pounds were placed under loan, nearly double that of the previous season and the highest in three years. Still, loan takings were considerably below placements in the 1980-86 seasons.

Government price support is mandatory for tobacco produced under marketing quotas. Support levels for 1990 have not been set although preliminary figures indicate the flue-cured support will increase between 2 and 3 cents a pound.

Flue-cured and burley price supports are the level for the preceding year adjusted by changes in the 5-year moving average of prices (two-thirds weight) and changes in the cost of production index (one-third weight). Costs include general variable expenditures, but exclude costs of land, quota, risk, overhead, management, marketing contributions, and other costs not directly related to the production of tobacco.

Marketings from the 1989 flue-cured crop and unsold 1988 production were about 5 percent above last year's marketings. But, with a smaller carryover, flue-cured supplies for 1989/90 are about 2 percent below last season. The flue-cured effective quota was increased about 11 percent this year. Because of excess production in 1988, 30 to 35 million pounds of 1988 crop tobacco were sold in 1989. Some growers have tobacco in excess of their penalty free quota (103 percent of the effective quota can be marketed without penalty) this year to carry into the 1990 season.

Under the acreage-poundage program, USDA is required to announce the national marketing quota for the 1990 crop of flue-cured tobacco by December 15, 1989. The 1989 basic quota was 890.5 million pounds, about the same as prospective use. Supplies have declined each of the last 8 years and represent about 2-1/2 years use. Because this season's marketings are below 1989's effective quota, the effective quota for 1990 will be higher than the basic quota.

Supplies of burley have declined since 1984, and now represent about 2.6 years use. The 1989/90 supply of burley tobacco is about 2 percent below last season. Carryover stocks on October 1 were 9 percent below a year ago because use exceeded 1988 production. This year's crop increased 14 percent from last year's. Acreage is up 13 percent and yields are a little higher.

Last season, disappearance of flue-cured tobacco totaled 885 million pounds, about 4 percent below the previous year. Both domestic use and exports fell. The 3-percent decline in domestic disappearance reflects smaller cigarette sales. Domestic disappearance during 1989/90 may decline a little because hiked cigarette exports probably will not offset reduced domestic cigarette consumption.

Flue-cured exports fell last year, but may rise this season because U.S. prices have been lower in recent years. Too, this year's crop is larger and is of relatively good quality.

Furthermore, despite some strengthening recently the dollar continues relatively weak and this should boost U.S. export prospects. However, U.S. exports may post only modest gains because of stagnant or declining cigarette consumption in major importing countries, reduced leaf use per cigarette, quotas and tariffs that discriminate against U.S. tobacco, and sufficient world supplies.

During the year ending September 30, 1989, burley disappearance totaled 577 million pounds, 9 percent below the previous year. Domestic use fell, but exports were up. Domestic use was down because of reduced cigarette production. Exports are up largely because of the better quality 1988 crop.

Total use of burley may increase in 1989/90. Both domestic use and exports may rise a little.

For both flue-cured and burley tobacco, legislation requires that the national quota be based on:

- 1) intended purchases by cigarette manufacturers,
- 2) average annual exports for the 3 preceding years, and
- 3) the amount of tobacco needed to attain the specified reserve stock level (15 percent of the basic quota or 50 million pounds of burley or 100 million pounds of flue-cured). USDA's discretion for setting the quota is limited to no more than 103 percent or less than 97 percent of the amount determined by manufacturer's needs and exports, and the reserve stock level. If a quota reduction is required, it is limited to a maximum of a 10 percent reduction.

The basic burley quota will likely be increased, but the basic flue-cured quota may not change much. The effective burley and flue-cured quotas will probably increase.

However, 1990 quota levels depend heavily on purchase intentions of manufacturers. Purchase intentions are the largest item in the formula for setting both flue-cured and burley quotas and they are especially large for burley. Consequently, purchase intentions are extremely important in quota determination and they depend on the industry's assessments of future stock requirements. For flue-cured, the export component will be lower, but reserve stock levels are below minimum requirements.

Among other types of tobacco, supplies of Maryland, fire-cured, dark air-cured, and cigar tobacco are all down.

Producer referendums will be held in early 1990 to determine if growers of Ohio cigar filler and Wisconsin cigar binder (types 42-44 and types 54-55) desire acreage allotments for their next three crops. Producers of flue-cured, burley, dark fire- and dark air-cured, and Puerto Rican cigar filler (type 46) tobacco approved marketing quotas in previous referenda. Maryland, Pennsylvania filler (type 41), and Connecticut cigar binder (types 51-52) voted against quotas in previous referenda.

A Look Ahead

Tobacco production in the United States may rise for the fourth consecutive year in 1990. But after 1990 U.S. production may begin to decline. The 1990 boost in production may bring production and use in line. However, even though cigarette exports are rising and U.S. leaf is being substituted for foreign leaf, the slide in domestic cigarette consumption may be more than offsetting and result in declining leaf use. Continued large hikes in cigarette wholesale prices, prospects for higher taxes, more and more smoking restrictions, and antismoking activities will almost surely lead to further reductions in domestic cigarette consumption. Cigarette consumption may fall an average of 2 to 3 percent a year over the next several years.



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POLICY ISSUES FACING THE TOBACCO INDUSTRY

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The outlook for the tobacco industry depends on a host of trends and potential changes in the factors that affect quantities demanded and quantities supplied. Many of these are discussed by Verner Grise in the other paper in this Outlook Session. Perhaps I should try to cover everything left over, but, instead I have taken the liberty of defining a more limited role for this presentation. These remarks will consider some of the major potential policy issues that may affect the U.S. tobacco industry in the next few years.

My coverage of policy topics will be selective rather than exhaustive. The specific topics that I will focus on are: 1) bilateral market opening and the pursuit of elimination of import restrictions for leaf and tobacco products under current international rules and domestic legislation, 2) the multilateral negotiations for trade policy reforms in the GATT and how domestic and foreign tobacco policies may be affected, 3) restrictions on chemical residues on exported leaf, 4) implications of the upcoming Farm Bill for the tobacco program and for the tobacco industry, 5) implications of current conservation rules, including conservation compliance, for tobacco growers and for the program, 6) tobacco program operation such as the use of secretarial discretion in setting changes in the basic quota and average price support each year, 7) potential changes in regulations governing quota including; reintroduction of a 10 percent rather than 3 percent over marketing of quota, legalization of intercounty quota sales or lease, legalization of burley quota sales and reintroduction of lease and transfer of flue-cured quota, 8) leaf marketing reforms and the potential effects of federal regulations or policies on the warehouse system, 9) cigarette taxation and other regulations in the use of tobacco products, 10) seasonal hired farm labor issues and regulations including the effects of immigration law reform, the SAWS and RAWS programs, the H-2A program and the recent changes in the federal minimum wage.

In the following pages these topics will be discussed in turn. Some topics warrant more detailed discussion and some a mere mention.

International trade issues.

Among the most significant changes in the U.S. tobacco industry in the last few years has been the major increases in cigarette exports. These exports have been responsible for increases in the positive trade balance for the tobacco sector and have also increased the domestic demand for U.S. leaf by U.S. manufacturers. Initially there was some concern that cigarette exports would replace leaf exports so that more tobacco value would be exported but no more U.S. leaf would be shipped. This fear has not materialized as foreign manufacturers seem to have increased the share of U.S. tobacco in their blends. Among the significant factors underlying the increase in cigarette exports have been the successful efforts of the U.S. Trade Representative in encouraging foreign governments, on a bilateral basis, to relax import barriers for U.S. cigarettes, especially in Asia.

The tobacco cases have been among the most dramatic successes of the Trade Representative's market opening campaign of the last several years. Additional efforts in other countries to allow U.S. imports to compete on an almost equal footing with domestic cigarettes promise to increase tobacco exports even further. But, these successes have not been without controversy. The same political forces that lobby for smoking restrictions have argued that opening foreign markets to tobacco product imports is inconsistent with a domestic policy to encourage smokers to quit. The anti-smoking lobby has raised public awareness of cigarette exports and put pressures on the Trade Representative to refrain from working to eliminate tobacco trade barriers. The facts, of course, are that smoking is a long standing practice in the countries with import barriers. The reason that they restrict imports is that they have powerful tobacco industries of their own to protect. So far there is no evidence that allowing imports increases overall tobacco consumption significantly. However, the U.S. government and the tobacco companies must be careful to ensure that our trade pressure is only to eliminate import barriers. Certainly, it is U.S. policy that sovereign countries may regulate smoking as they wish so long as domestic products and imports are treated similarly.

Equal treatment of imports is also a goal of proposed GATT reforms. The current GATT round for agriculture is reaching a critical juncture. The latest version of the U.S. GATT proposal for agriculture suggests major changes in agricultural trade relations to be phased in over the decade beginning in 1991. Tobacco is explicitly listed among the commodities covered by the proposed liberalization, as it should be. The U.S. has much to gain from tobacco trade reform. The potential for increased exports if trade barriers and subsidies are reduced world wide is very large. The U.S. tobacco industry is in a good position to capture the benefits of new trade opportunities. First, I want to mention the potential for net export expansion and then discuss the implications of the GATT for the U.S. tobacco program.

The United States is currently the largest tobacco exporter and the largest tobacco importer in the world. The import side of this trade reflects the already open nature of U.S. tobacco markets and the fact that tobaccos differ in their characteristics and uses by type and by growing conditions.

Even with complete tariffication, as contained in the U.S. GATT proposal, there would be little reason for imports to increase into the U.S. Current U.S. leaf imports pay only an ad valorem tariff and most of the tariff payments are rebated because an equivalent amount of product is subsequently exported. Unlike dairy products, sugar, peanuts, beef or some other agricultural products, the U.S. tobacco industry is not protected by significant non-tariff barriers.

Other countries are not so open in their tobacco markets. Since cigarette industries are usually either national monopolies or heavily regulated, even when explicit non-tariff barriers are not present, imports are limited by official buying practices that favor domestic leaf. Liberalization would expand U.S. exports to traditional markets like the E.C. and Australia and would place even more pressure on Japan and Korea. A major new potential market for tobacco exports is in eastern Europe. These nations are major consumers of tobacco products and recent political changes will likely increase the effective demand for high quality consumer goods and make imports from the west more acceptable. In addition, several of the major markets, including the Soviet Union, have expressed an interest in GATT membership and need to show a willingness to allow imports.

Agricultural trade policy reform includes reducing the domestic production subsidies that are implicit export aid or import restrictions. The most recent U.S. proposal explicitly excludes supply control measures that reduce resources in an industry from GATT sanction. It is unlikely that other members will object to this suggestion. In general, measures that expand production upset trading partners because producers not consumers are the politically powerful groups in trade policy.

The U.S. tobacco program consists of quotas and price supports administered by the USDA. As I argued at the Tobacco Workers Conference in Tennessee last winter, the tobacco program is in essence a grower cartel that achieves higher prices for leaf through the quota that limits supply. The price support feature is really just an administrative convenience as is the heavy USDA involvement in program operation. The same basic results could be achieved with only federal authority to operate the quota system through the grower cooperatives. Such changes in program operation would eliminate any concern that the GATT reforms would force major changes in the quota system itself.

An additional trade issue currently facing the leaf industry deals with chemical residue regulations on exported tobacco leaf. In particular, exporters are concerned that residue limits in import countries be based on scientific evidence and be more standardized across markets. Industry representatives can and do negotiate with importers themselves, but their efforts are strengthened if they are also supported by the U.S. Trade Representative. The current GATT round for agriculture has placed a high priority on the standardization of phytosanitary import rules and the documentation of a scientific basis for import restrictions. This will be an aid to the U.S. tobacco export industry but it also means that the U.S. must be careful that our own chemical residue rules do not constitute unfair trade barriers.

Domestic tobacco program issues.

At the beginning of the 1990 farm bill year it is useful to remind people that the tobacco program was not a part of the Food Security Act of 1985 and is not subject to the debate on the new farm bill. The tobacco program may indeed be revised in the coming legislative session, but these potential changes are not necessarily a part of the legislation concerning the other commodity programs. These potential changes in the tobacco support prices and especially quota regulations will be discussed below, but first it is useful to consider the more indirect effects of the farm bill on the tobacco industry.

Tobacco generally is little affected by the target price, loan rate or acreage reduction features of other commodity programs. At the farm level, tobacco acreage is unlikely to be reduced if other crops become unusually profitable and other program crops are also unlikely to compete seriously for labor or other resources. Further, unlike some grain or oilseed crops, tobacco does not face substitution on the demand side from other program commodities -- no one has yet proposed oatbran cigarettes. The influence of farm bill provisions on tobacco comes not from commodity programs but mostly from conservation or environmental regulations. One such program feature contained in the 1985 Act and likely to be revisited is the conservation compliance regulation.

Most discussions of conservation compliance have been related to crops with voluntary commodity programs. Of course tobacco programs are not voluntary. If you grow program tobacco types, you are a participant in the program. This means that all tobacco growers (except growers of types 32 and 51-52) must meet conservation compliance rules. At least in the case of flue-cured tobacco, conservation compliance rules seem to be playing a significant role in discussions of quota sales and farm rental. The new conservation regulations took effect at the same time that lease and transfer of flue-cured quota was eliminated. Growers and quota owners replaced lease and transfer with whole farm lease and arrangements by which the landlord was considered an active participant in the farm operation. Under the new conservation rules, growers are responsible for meeting conservation standards on all farms they 'operate' even the farms that are only used as sources of quota. For some growers it is not worth the trouble to try to file conservation plans or meet other requirements when their only interest is to have access to the right to grow the tobacco quota assigned to a farm. The result is that some quota may not be used. Further, the implicit lease value of rented quota will fall because growers have to satisfy additional rules (even if no land on the farm is used for program crops). We are likely to see more quota sales and further consolidation of production as farms that do not wish to comply with conservation requirements will get out of tobacco altogether. In the burley areas, lease and transfer of quota may reduce the pressure from compliance. The prospect for the 1990 farm bill is that conservation rules will be made more restrictive.

The price support and quota adjustment arrangements set up in 1986 seem to be operating about as the industry had hoped. So far there seems to be no major problem with how much basic quota levels have increased or how much the

price support has increased in the first few years of operation. Of course this period has been an odd one, with the buy-out of flue cure leaf stocks, the expansion of cigarette exports, and other temporary factors affecting demands. The formulas used for setting the price support and quota (including the allowance for Secretarial discretion in adjusting each) do not explicitly state a connection between revision each year in the quota and price support. However, the two are intimately linked, if not by federal statute then by a more compelling law.

The supply and demand linkage between price support and quota is achieved with a lag but is none the less binding. In a year in which leaf is in short supply in the market (say because demands are unexpectedly strong) several effects on the price support and quota for the following season may be noted. First, the season average price will have increased, leading to a positive movement in the price support in the following years. Second, if exports do increase, this increases the projected quota directly. Third, some demands will have been left unsatisfied leading to an increase in buyers intentions and to higher quota. Fourth, low amounts going under loan and increased amounts leaving stocks also increase quota for the next year. So in this example the underlying demand shift results in both an increase in the price support and in the quota. One would expect the same supply/demand reasoning to inform the use of discretion by the Secretary of Agriculture. If he thinks that the formulas have over anticipated the demand curve shift, he would scale back the price support or the quota or both. If he thinks that the demand shift has been larger than the formula response, he would allow more increase in price or quota or both.

Yield shortfalls or unusually high production also cause price support and quota to move together by the formulas and by the underlying supply and demand forces. In that case, however, the Secretary may limit the change in base quota to allow the effective quota adjustments or on-farm carryover to reflect more of the quantity adjustments. Now consider the effect of an increase in farm production costs. The price support formula in the subsequent year would indicate an increase but the basic quota level would not be affected directly. The higher price support would cause a higher average market price even though the market price/support price differential would tend to fall. The higher price support would also cause reduced export sales and larger quantities under loan. So in the third year the pressure is for reduced quota. If this scenario is anticipated by the Secretary, he might allow only a part of the price support increase in the first place and also reduce the quota initially to be more consistent with a higher support price and a fixed demand curve.

In these examples, the role of the Secretarial discretion has been to allow the formulas to work more quickly and to reduce the lag between an underlying shift and the full adjustments in price and quantity. Of course, no one can know what has really happened to supply and demands in the past, let alone know what will happen in the future. Therefore, the use of any mechanical formula or bureaucratic price and quantity fixing must be expected to be clumsy at best. The U.S. tobacco program is modelled after the kind of mechanisms used in economies like the Soviet Union or East Germany so we should expect some amount of imperfection. The idea of the U.S. tobacco

program is to use government authority to limit output to thereby raise the price. This has to entail some amount of approximation and the trick is to avoid long term imbalances.

Among the recent changes in the quota system was the reduction in the amount of production over quota a grower could market in years of unusually high yields. The reason that over marketing has been allowed is to recognize that crop output cannot be controlled completely and that it is more expensive to store unsold tobacco on the farm than to process it and let it be stored by the buyers. But, the previous level of ten percent over marketing is much more in line with year to year yield variability. For example, average standard deviations from a linear trend in yield for 54 North Carolina flue-cured counties is about eight percent. And it is well known that farm yields are more variable than county average yields. Limiting over marketing to three percent causes higher grower costs with little apparent benefit to anyone in the domestic tobacco industry. However, the cost and inconvenience of limited marketing of over-quota production is not observed on a large scale every year, and while there is some sentiment for returning to ten percent over marketing, it is not clear that this change or any other will be enacted soon.

Restrictions on quota transferability have long been seen as a major source of inefficiency in mandatory supply control programs. Any rule that works to slow the transfer of production to the most efficient producers tends to raise costs of production and reduce an industry's competitiveness. However, government supply control programs, everywhere in the world, tend to restrict not only how much of a commodity can be produced or sold but who is allowed to produce. Flue-cured tobacco has seen a series of changes in supply control restrictions over the years. The most recent rules allow the sales of poundage quota but limit lease of quota separately from land to emergency fall leasing only. Burley tobacco rules allow lease and transfer but do not allow the sale of quota. It is interesting to speculate why these different restrictions evolved, but instead I want to focus on potential changes in the rules.

Flue-cured and burley tobacco share the common limitation that quota is not allowed to be moved across county lines except in extreme cases and in what has been minor amounts. There has recently emerged some pressure from both growers who rent-in quota and from quota owners who rent-out quota to allow cross county movements. It is not clear that effort to relax this restriction will be taken seriously by legislators, but it is worthwhile to consider the potential impact of cross county quota movements.

In the case of flue-cured quota, there is little doubt that production would move from the piedmont counties and towards the coastal plain with an elimination of restrictions. The most direct evidence for this fact is seen in quota sales prices that are close to zero in some old belt counties compared to in the range of \$3.00 per pound in eastern North Carolina. Tobacco that remained in the old belt of North Carolina and Virginia would need to be compensated for relatively high per pound production costs with higher leaf prices. This would occur as production left these counties if manufacturers wanted to maintain some tobacco from the old belt in their

blends. The direct beneficiaries of quota movements would be those growers that added quota in the "receiving" counties and the quota owners selling or renting quota in the "sending" counties. Currently a quota owner in the North Carolina piedmont might get as little as fifty cents per pound or less when selling quota, while a buyer might pay more than \$3.00 per pound a few counties to the east. The direct losers from intercounty movements are obviously the potential buyers or renters in the sending counties and the quota owners in the receiving counties. Intercounty movement would cause quota prices to equalize at an intermediate position.

Second round effects of intercounty quota movement would be felt by those in the supply and marketing businesses that service their local growers. Again, some would gain and some would lose. In addition, we would expect to see some long term slowing in the growth of tobacco prices as the lower cost of production in receiving counties showed up in the price support formula. More efficient production would allow the U.S. industry to return larger aggregate quota rents and also establish a larger industry in the face of international competition.

The effects for the burley tobacco industry parallel those for the flue-cured industry except that the major receiving area would be central Kentucky. The mountains of North Carolina and other outlying burley areas would lose quota. These areas are identified by low lease rates and by high rates of under marketing of quota under the current system. In the case of burley, underproduction is a major issue and some streamlining of quota transfer rules (such as quota sales) may be expected sometime soon even if intercounty quota rental or sales is not allowed.

Some people have suggested that if movement of burley quota is allowed, the North Carolina piedmont is one of the regions that could compete profitably for burley production. Of course, we have no real data on burley production costs or lease rates in the counties that currently produce only flue-cured tobacco so whether burley would move to the piedmont or not is more than usually speculative.

Tobacco marketing.

The tobacco marketing system has long been subject to claims that it is outmoded and inefficient. Buyers, growers and observers note the antiquated auction warehouses and old fashioned grading and bidding procedures and suggest that they should be replaced with a more modern system. For the past year a study group from both the burley and flue-cured areas have been discussing the current system and the potential for beneficial changes. This study process is still underway but a few general remarks are in order. The initial questions that must be asked about any economic institutions are: what are the incentives for change and what barriers inhibit increased efficiency? An innovation that reduces leaf marketing costs to the growers, to the buyers or to the warehouse operators will yield returns to all involved. If buyers were willing to pay higher prices in warehouses that had better lighting or other facilities, we would see growers flocking to these outlets. If a warehouse could reduce grower marketing costs by offering more efficient unloading or other services at relatively low cost these improvements would indeed be profitable. The point is that incentives for

cost reducing or quality enhancing improvements are indeed present in the current system with competition among warehouses in most markets.

Do barriers prevent otherwise profitable innovations from taking place? One natural place to look for barriers to reduce is in federal regulations of the marketing system. Rigid governmental rules can reduce or eliminate innovation. The basic quota system requires that production of both flue-cured and burley tobacco types be grown across a relatively dispersed geographic area. This does add to the number of sales markets. But nothing in the basic quota system requires anything like the numbers of auction warehouses currently used for each major tobacco type. The price support system requires government grading that is based on visual inspection of leaf in relatively small units. This grading does encourage the use of relatively costly inspection for leaf to be eligible for price support. It may be that a more streamlined grading procedure based on chemical tests or based on larger inspection units could be more efficient. However, there seems to be little pressure from either buyers or growers for this sort of change.

Overall, it is hard to identify any particular regulation that inhibits the adoption of profitable tobacco marketing changes. It still may be that the sum of all the regulations keeps innovation in tobacco marketing to a minimum or that some as yet unidentified rules are particularly restrictive. However, it may also be that tobacco leaf marketing in the United States is really not so inefficient as one might initially think. It is important to reject the hypothesis that there are obviously profitable opportunities readily available that are ignored by those in the industry. That is not to say that some innovative person or firm will not improve the way business is done. I do suggest, however, that innovation is more likely to come from within the industry than from the outside. The role of outside analysts is to try to understand the underlying forces for change and the forces that limit change.

Regulation and taxation of tobacco consumer products.

The other marketing issues facing the tobacco industry concern the marketing of consumer products. I will not dwell on this topic, but clearly, the demand for U.S. leaf tobacco is derived from the demand for consumer products containing domestic leaf. Therefore, the domestic leaf industry is affected directly by regulation of tobacco use in the United States and in other markets. Verner Grise has documented that cigarette consumption in the U.S. is continuing to fall and something like this pattern is taking place elsewhere. Consumer product regulation is not the root cause of demand shifts, but is more likely a symptom of the sentiments that underlie these declines in per capita tobacco use. The amount that regulations themselves contribute has not been thoroughly documented and the econometric evidence is not easy to develop.

One demand factor that is well understood is cigarette taxation. A large number of studies have documented the sensitivity of tobacco consumption

to price. An increased cigarette tax that adds another ten percent to the retail price of cigarettes will reduce consumption by somewhat less than five percent. This elasticity seems to have declined in recent years but is still significant. The federal tax increase in 1983 and the state tax increases that have taken place since then reversed a long period of falling inflation-adjusted cigarette taxes. Those tax increases and recent increases in the pre-tax price of cigarettes have also taken their toll on consumption. Given these large price increases, it is not clear how much impact on tobacco use that additional regulations on when and where consumers are allowed to smoke have had.

Seasonal Farm Labor.

After moving from international issues in tobacco marketing through farm regulations and back to cigarette marketing, I now want to return to a set of policy issues that seem to be among the most important in the minds of many tobacco growers. Seasonal farm labor is a perennial concern to many agricultural industries. The tobacco industry has gone through a number of major changes in labor supply and demand conditions in the last decade or so. These changes in market conditions have raised seasonal labor on the agenda of concerns. The recent changes in immigration regulations follow a period in which tobacco growers had only recently begun to use immigrant seasonal labor in large numbers. It is generally thought that most of the immigrant seasonal labor used in the first half of the 1980s was in the U.S. illegally. After 1987 worker sanctions have made it troublesome to hire illegal aliens and many growers seem to have embraced the legalization of seasonal worker immigrants in the SAWS program and the replenishment of the immigrant agricultural work force with the RAWS program. Little is yet known about how these programs have or will work for tobacco labor. It is difficult for national surveys to provide complete information about hired farm labor markets in general, and the data about tobacco labor markets is particularly sketchy.

In order to add to the information base on season labor in tobacco, Steven Allen, a N.C. State University labor economist, and I conducted mail surveys of several hundred North Carolina flue-cured tobacco growers concerning hired labor demands and supplies covering the 1986 through 1988 crop years. A new survey for 1989 will be distributed this coming January.

We received responses from over 700 growers from 18 eastern piedmont and coastal plain counties that produce well over half of the North Carolina tobacco crop. Most of the respondents to the first mailing, that covered the 1986 and 1987 crop years, also responded to the survey covering the 1988 crop year. Our survey does not meet USDA standards for being a true random sample of the flue-cured tobacco industry but the basic patterns we have found are consistent with other information on wage rates and farm practices, with general impressions of those in the industry, and with the expectations from basic economic reasoning about reactions to the new regulations. I want to highlight here a few of the preliminary results from the initial rounds of the North Carolina survey.

- The percentage of seasonal workers who are immigrants continues to grow at a rapid rate. In 1986 the respondents to our survey estimated that 25 percent of the seasonal farm workers in their county were immigrants. This figure increased to 36 percent in 1988. This trend is also reflected in the increased use of seasonal workers who are Mexican or speak Spanish. In 1986, 17 percent of the growers in our survey said that most of their seasonal workers were Mexican, whereas in 1988 we found that 32 percent of the growers were using mostly Mexican seasonal labor.
- Use of immigrants varies across the state. Middle belt growers use more immigrants and border belt growers use fewer immigrants than growers in the East. In 1988, growers in Wake, Wilson, Harnett, and Nash counties estimated that over half of the seasonal workers were immigrants. However, in Robeson, Cumberland, Bladen, and Columbus counties, growers estimate that fewer than 15 percent of the seasonal workers were immigrants.
- Wages for seasonal farm workers have increased more rapidly than wages for other workers in North Carolina. Our study found that average wages jumped from \$3.73 in 1987 to \$3.98 in 1988, an increase of 6.7 percent, while average wages for all North Carolina workers increased by only 3.7 percent in 1988. There is also considerable variation by county with a low county average wage of \$3.55 and a high of \$4.64 in 1988. Note that these averages are well above the current minimum wage and at the recent rate of growth they will remain above the proposed new minimums, when those standards take effect.
- More growers are using mechanical harvesting methods. In our first survey we found that only 14 percent of the growers were using mechanical harvesting in 1986. The proportion of farmers using mechanical harvesters grew to 21 percent by 1988.
- Most growers have not experienced any crop losses because of inadequate supplies of seasonal labor. However, in some counties a significant proportion of growers did suffer losses. In all three years of our survey, the share of growers who have been unable to plant or harvest some of their crops because they could not find enough seasonal labor has held steady at around 10 percent. Yet there are a few counties where many growers report losing some crops because of labor shortages. For instance, 29 percent of the growers in Nash County reported losses in 1988.

These preliminary results indicate that while there have been significant adjustments in labor market behavior, most North Carolina growers have been able to cope successfully through 1988 with the immigration reform law. There is, however, a great deal of unease about the future, as well as uncertainty about the Replenishment Agricultural Worker (RAW) and H-2A programs.

Other labor issues facing the industry relate to health and sanitary regulations. In general most growers comply with and even support practices that assure workers of safe and sanitary working and living conditions.

Clearly seasonal work in tobacco is hard and hot and dirty. Also the workers are, for the most part, poor by American standards. Given these realities, it is in the economic interest of most growers to encourage more and better work by their laborers and to retain their better workers by providing drinking water and other facilities in the fields that satisfy workers needs. The same incentives encourage fairness in wage and other employment relations and in provision of housing. The major concerns of most growers relate to what they consider harassment by regulators and workers' advocates. Like all economic regulations, farm worker rules must be enforced with an amount of reasonableness and consistency to be effective. Almost any producer could be found in violation of some rule at some time. Growers tell stories of silly enforcement and petty violations of the letter of a law while sometimes serious violations are ignored.

The costs of legal responses to regulators or of defence in civil suits brought by workers' advocates is prohibitive even for relatively large growers. It may make sense, therefore, for growers to arrange for legal services in part through a sort of legal insurance program. Such insurance would need to be controlled so that only growers meeting high standards were allowed to participate. In that case, the program could also serve as a deterrent and a signal to regulators and others that the grower-members were generally complying with regulations and were prepared to contest unfair application of regulations. Growers that were not a part of the system because they were deemed ineligible would be even more vulnerable to legitimate enforcement of reasonable regulations. It is not clear that such a labor law insurance institution would be actually useful or feasible but tobacco growers and others do have an interest in finding a way to deal with a major frustration.

As our survey results document, some growers have responded to problems of finding workers and with regulatory uncertainties by moving to more mechanical harvesting. This reduces the need for seasonal labor but does not eliminate it. Another approach, new to flue-cured tobacco, is the use of H-2A program. It is not yet clear that H-2A workers will become important in tobacco, but there has been some recent experimentation with this temporary immigration program. In general, hired farm labor has become a larger concern to the tobacco industry as size of operation has increased and as federal government policies have made the labor market more difficult for producers. These concerns seem destined to continue.

Conclusion.

The next few years will be important ones for the U.S. tobacco industry. However, I do not think that anyone expects a repeat of the kind of changes in policy that occurred in the middle of the 1980s. The tobacco program seems to be operating with relatively minor problems for those in the industry and changes are not likely to threaten the existence of the industry or the program. Trade policy shifts may affect tobacco demand but, if handled carefully, GATT reform and bilateral negotiations will improve markets for the U.S. tobacco industry. The tobacco industry has had many years to get used to

issues related to cigarette demand and the 1990s are not likely to deviate markedly from the 1980s in this regard. Finally, while labor problems are on their minds, most growers are adapting to changes in labor markets and regulations.

A wide variety of federal government policies affect the tobacco industry. To understand the outlook for the industry requires an understanding of what policies are likely to prevail in the future and an understanding of the implications of those policies. I hope that this brief review has helped to highlight some particularly important issues and perhaps some policy changes that may be on the horizon. Looking at recent trends is the best way to anticipate the near future but analysis of underlying forces is also required if we are to prepare for or affect the longer term course of events.

OUTLOOK FOR U.S. AQUACULTURE

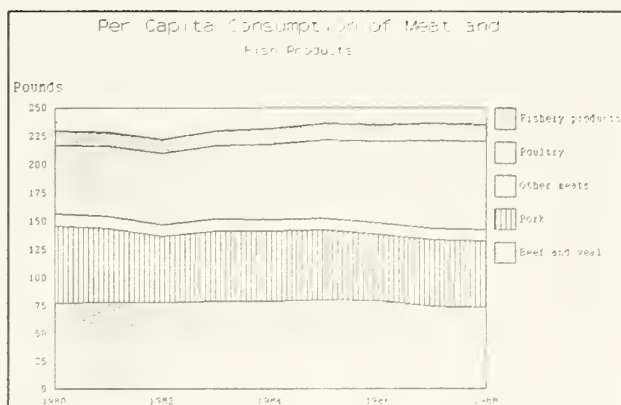
Michael R. Dicks¹ and David J. Harvey²

Introduction

Amidst the clamor over the safety of the U.S. seafood supply, quality of imports, and volatile prices, several recent trends in fishery products faltered in 1988. The U.S. supply of edible fishery products declined from 1987's record level, after having posted an almost continuous 4 percent annual growth rate in this decade. Domestic landings of edible fishery products were up 16 percent in 1988, increasing to 4.6 billion pounds. This is the second year of strong increases, providing evidence of a turn-around from the steady declines seen during the last ten years. Imports of edible fishery products declined 7 percent to 3.0 billion pounds representing the first decline since 1982. The high, 20 percent annual growth rates demonstrated by aquaculture in the 1980's slowed to only a 5 percent increase in 1988.

With changes in total supply and composition of that supply came changes in per capita consumption. After posting an average annual rate of growth of 5 percent over the last five years, per capita consumption of edible fishery products declined by 2 percent in 1988 to 19.8 pounds. While per capita consumption of aquacultural products increased slightly over last year, consumption of products from recreational catch and commercial landings declined slightly.

Nearly 20 pounds of fishery products were consumed by the average American in 1988. This represents roughly 9 percent of the relatively constant total per capita consumption of animal protein in the United States. While the per capita consumption of all animal protein has remained relatively steady at about 240 pounds, a change in the composition of demand has occurred in this decade. Per capita consumption of red meats (beef, pork, and lamb), the largest component of animal protein in

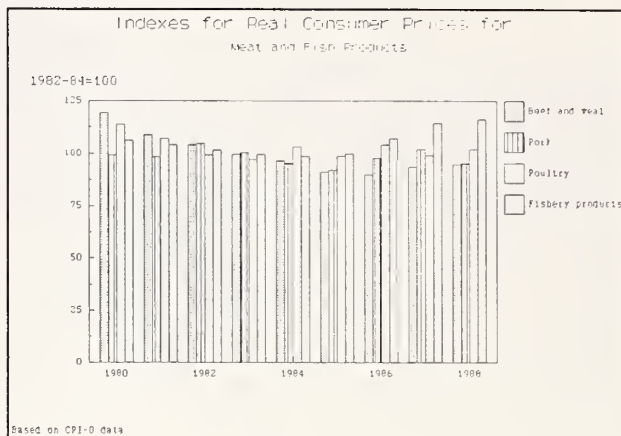


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the American diet, has declined from nearly 160 pounds in 1980 to about 140 pounds in 1988. White meat (fish and poultry) consumption on the other hand, has grown from about 75 pounds to nearly 100 pounds per capita.

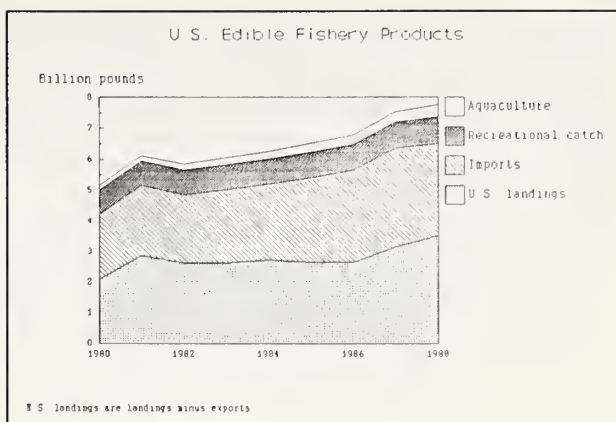
Numerous studies (Buse, 1989) debate the reasons for the change in composition of animal protein demand, including changes in relative prices, per capita incomes, demographic composition, population growth, processed products, and tastes and preferences (structure). Most studies point to structural change only as the unexplained residual. None of these studies include fishery products. A recent study by Purcell (1989) describes a series of demand shifts accompanied by price induced changes in the quantity demanded for beef, pork, lamb, and broilers. Purcell notes that the structural change which began in the late 1970's, showed the first signs of improvement for red meats in 1988. The potential turn around for red meats coincided with a decline in per capita consumption of fishery products.



The seafood industry identified increased prices and food safety concerns as the two principal factors which contributed to the 1988 decline in per capita consumption. Real prices for fishery products, as measured by the CPI, have increased consistently since 1982, while real prices for red meats have declined over this period. The 16 percent growth in domestic landings was accompanied by a 3 percent decline in the average price per pound, while the 7 percent decline in imports was accompanied by a 3 percent increase in average price per pound. However, a portion of the change in value per pound may be attributable to changes in the relative share each species of fish and shellfish contributes to total supply. Whether the changes in the demand for fish and red meats is indicative of a change in consumer preference or was a reaction to prices remains to be seen.

Rising domestic demand has been a catalyst for growth in the seafood industry and particularly for aquaculture. Annual income growth, changing demographic composition and population growth are the main forces behind an increasing demand for animal proteins. Changes in relative prices between meat products and other protein sources have a measurable impact on the composition of animal proteins consumed. However, a large share of the increase in per capita consumption of fishery products cannot be accounted for by these variables alone and is often attributed to changing consumer preferences. Americans consumed almost 8 billion pounds of fishery products in 1988, compared with just over 5 billion pounds in 1980, a 60 percent increase. Blaylock and Smallwood indicated a 20

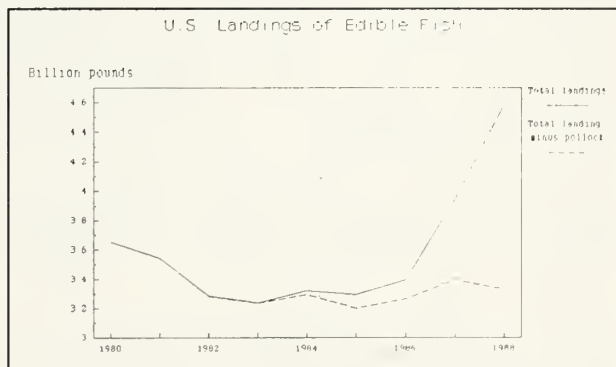
percent increase between 1980 and 1990 would be likely based on changes in income growth, demographic changes, and population growth. With relative prices constant, only one billion pounds of increased fishery product consumption is accounted for by traditional demand shifters, giving credence to the hypothesis of changing consumer preferences as the main source of demand growth. Almost 45 percent of the consumed fishery products were supplied



by domestic commercial catch, 36 percent by imports, roughly 10 percent by recreational catch and just less than 10 percent was supplied by aquaculture. The composition of supply were considerably different at the beginning of the decade with imports providing the largest share at 42 percent, domestic catch providing about 40 percent, recreational catch providing just over 15 percent and aquaculture providing less than 3 percent. The percentage of total supply from recreational catch has declined, as recreational catch per capita has remained relatively constant, between 3 to 4 pounds, for more than two decades. The estimates of the quantity supplied by aquaculture could be conservative because of numerous stock ponds, fee-fishing operations, and commercial aquaculture ventures that may not be captured by recent surveys.

Even with conservative estimates, the increasing importance of aquaculture to the U.S. supply of edible fish products can easily be seen. A closer examination of the components of U.S. landings will aid in emphasizing the increasing importance of aquaculture.

U.S. landings of edible fish surpassed imports as the largest component of the U.S. supply of edible fish products in 1988, for the first time in four years. Landings have increased 35 percent in two years as a result of tremendous increases in landings of Pacific pollock. This large increase can be attributed to the increased U.S. demand for a constant quality, low priced, relatively bland white-fleshed fish. Although the U.S. fishing fleet may have caught a large share of this pollock in the past, it was not landed at U.S. ports. More

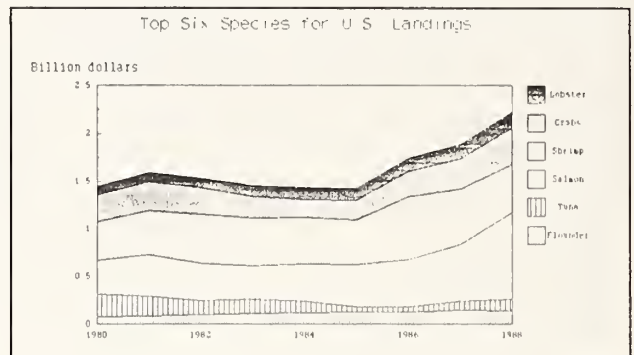


than 40 percent of the U.S. fishing fleet's harvest is sold to foreign processors off-shore, where it is processed and then sold in U.S. markets (joint ventures). Higher prices and implementation of the Magnuson Fishery Conservation and Management Act of 1976

have led to a reduction in foreign fishing in the U.S. Exclusive Economic Zone (200 mile zone), the purchase of processing ships by the U.S. fleet, and thus significantly higher domestic landings. Without the contribution of pollock, U.S. landings would be 25 percent lower, and imports would have provided a much larger portion of the total U.S. supply.

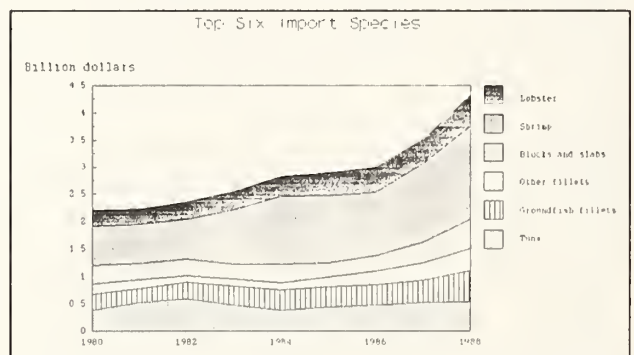
Of total U.S. landings in 1988, finfish accounted for 82 percent of the volume, but only 57 percent of the value. Menhaden (used to produce fishmeal and oil) and pollock accounted for 47 percent of the volume, but only 6 percent of the value. Shellfish represented only 18 percent of the volume but 43 percent of the value of U.S. commercial landings.

Except for pollock, U.S. landings of edible fish and shellfish would have declined in the 1980's. The continued decline or stable landings of traditional high valued species such as shrimp, crabs, and salmon and increases in landings of lower valued species such as pollock tends to reduce the rate of return on investment and increase concentration in the industry. Throughout most of the 1980's the increasing demand for fishery products combined with declining domestic landings for many species has led to an increasing trade deficit in fishery products.



With the exception of tuna, aquaculture could produce substitutes for many of the top import products. Shrimp, the largest import product accounts for more than 30 percent of the total value of edible imports in 1988. Although aquacultural production of shrimp and prawns in the United States has not proven to be economical, future technological advances may enable increased domestic production. Also domestic products such as soft-shell crawfish may, with aggressive marketing, acquire a portion of the shrimp market.

Fish blocks and slabs, used to produce products such as fish sticks, cakes and patties, are likely to continue as the fastest growing import (volume) in the 1990's as landings of pollock reach maximum sustainable yields and the number of convenience products continues to increase. Competition between fresh and frozen fillets will become even greater, particularly for less distinguishable white fish such as flounder,



sole, and catfish. The harvest and supply of mollusks from natural marine beds will likely continue to fall because of the lack of any real progress in removing pollutants from coastal waters. Again, as the demand for oysters, clams, and mussels continues to increase it will provide incentives for the artificial cultivation or depuration of these high valued mollusks. The increasing world population, changing demographic characteristics, and advancing income levels overseas will create real growth potential for aquacultural products in foreign markets. As stocks of traditional species continue to decline (Siegel, 1989), aquaculture will be called upon to fill the gap.

The major U.S. export product, both in volume and value, is salmon, representing nearly one-third of total volume and one-half of total value of exports. The value of salmon exports increased 37 percent while the quantity exported increased only 9 percent between 1987 and 1988. If the U.S. supply of salmon from aquaculture and commercial landings continues to increase, and restrictions placed on foreign fleets continue, U.S. exports may rise and the trade

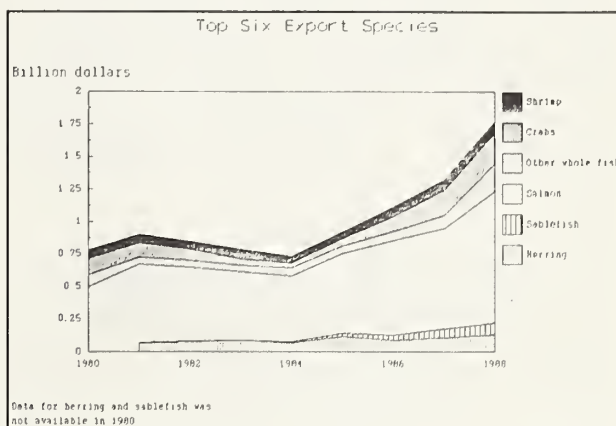
deficit in fishery products could decline. However, aquaculture production of salmon is growing throughout the world and domestic wild harvest will be forced to compete with foreign and domestic aquaculture production.

Trout, crawfish, and catfish products also face large potential export markets. However, producers of these products must compete with large processing and marketing firms which trade in traditional seafood items. Considerable time and capital will be required to gain entry to the lucrative international markets. This may be difficult for industries already struggling to obtain capital for research and development.

Aquaculture

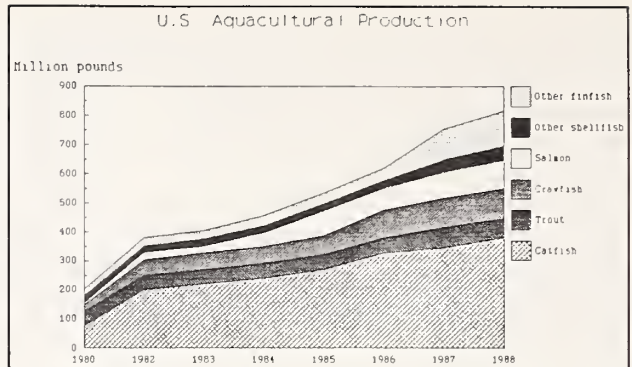
While aquaculture is the smallest component in the supply of edible fishery products it is having a major affect on the quality, volume, and value of trade in edible fishery products. A major share of salmon and shrimp production, two products with the highest volume and value traded on world markets, is produced through aquaculture.

Nearly 90 percent of the volume of edible fishery products from U.S. aquaculture is accounted for by four species: catfish, crawfish, salmon, and trout. Numerous other species such as tilapia, striped bass, sturgeon, carp, and walleye are being produced in limited quantities. Aquaculture of mollusks (clams, oysters, mussels) is limited but showing strong potential for



growth as off-shore pollution problems continue. Numerous other edible products such as alligators, spirulina, and eels and non-edible products such as ornamental and bait fish are also produced by aquaculture.

Aquaculture occurs in salt and fresh, warm and cold waters, in cages, beds, raceways, tanks, ponds, and other types of confinements in nearly every state in America. Aquaculture besides producing edible products also is a way to utilize agricultural by-products and provide recreation. Aquaculture producers sell their products to other producers, live haulers, processors, wholesalers, retailers, and directly to consumers.

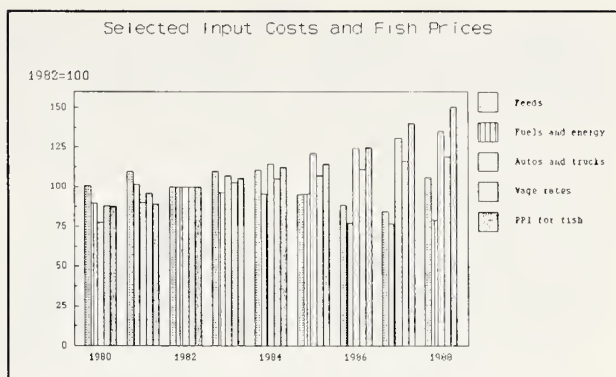


Growth in the domestic aquacultural industry during the last decade is almost entirely the result of growth in catfish production. While production of catfish for the processing market increased steadily from less than 50 million pounds to nearly 300 million pounds, total production including fee-fishing, direct sales, and other outlets, has increased from about 70 million to almost 400 million during the 1980's. A major reason for the steady growth in demand for catfish has been the shift in preference from red to white meats. Catfish has filled the demand for a white, relatively bland fish of consistent quality, year around availability, and relatively stable price.

In addition to helping to slow the growth in the trade deficit for fishery products, aquaculture has helped revive many communities in rural America. In fact baitfish, catfish, crawfish, and trout have become major industries in many rural communities. In the Mississippi Delta, the catfish industry a major employer providing an estimated 220 new jobs within the industry for every 10 million pounds of fish produced. An additional 1100 jobs in related urban and rural industries are created to provide inputs to aquaculture, transport and market products, and provide goods and services for new employees. However, aquaculture was not developed in the Mississippi Delta to promote rural development, but as an income earning substitute for cotton and soybean crop producers. As the price for new technology (ie. automatic filleting, eviscerating, and de-heading machinery) declines relative to labor costs, capital will be substituted for labor and the number of new jobs created for each addition million pounds of production will decline.

The low and declining real feed and fuel prices in the 1980's and increasing real fish prices led to an ideal development scenario for aquaculture. However, real feed and fuel costs, which account for nearly 75 percent of variable production costs, are projected to rise in the 1990's while real prices for fishery products hold steady at best. Higher wage rates (resulting from an increase in

the minimum wage) will raise processing costs. Faced with flat retail prices and rising production costs processors will be forced to compete with producers (also facing rising production costs) for declining industry net returns. Thus, if growth in demand for fishery products slows, unless aquaculture is able to capture a larger share of the current market for fishery products, aquaculture producers will be faced with the same cost price squeeze faced by producers of traditional agricultural crops.



Obstacles to Expansion

The rapid expansion in aquaculture has resulted chiefly from increased acreage with relatively constant technology. The most significant factor influencing growth was increasing demand. If demand for red meats turns around in the 1990's aquaculture will be forced to compete more vigorously with traditional species for a share of the edible fishery market. However, the demand for fishery products is likely to continue to grow and if traditional stocks continue to decline there will be an increased reliance on aquaculture to fill the gap. The ability of aquaculture to increase production will partially depend upon the ability of the industry to overcome resource constraints, production problems, and institutional constraints. These constraints and problems were discussed in last years outlook conference (Dicks, 1988) and thus will be only briefly mentioned. Two relatively new issues may also present obstacles to industry expansion - food safety and lack of data. Food safety concerns were touted as being a major reason for the decline in per capita consumption of fishery products in 1988. Publicity surrounding this issue dampens demand and raises the cost of promotion. Implementing new food safety standards and/or inspection programs may increase processing costs. Lack of industry data hinders the decision making capacity of the industry, and federal and state governments.

Resource Constraints: New environmental restrictions and reduced trade barriers will increase competition for water and land resources. Future expansion in aquaculture will require less acreage, less water, but a substantial increase in technology. Combining management, capital, labor, and water resources will be increasingly difficult.

Production Constraints: Better control of predators and diseases, energy efficient methods of oxygenating water, genetic improvements, more efficient feeds and feeding methods, and increased stocking rates should increase productivity and help industry expansion.

Institutional Constraints: Conflicting Federal, State and local laws may hinder aquaculture development in specific areas and cause resources to be allocated for aquaculture in areas that may not be able to sustain a competitive position in the long run. Lack of credit and insurance for aquaculture enterprises increases the risk of production and inhibits potential expansion.

Food Safety Issues: The safety of the U.S. supply of fish and shellfish became a major issue following public announcements of contaminated aquatic environments, shellfish diseases, and contaminated fish. These incidences were isolated for the most part and frequently had little impact on the quality or safety of U.S. fishery products. Some consumer groups however, advocated less fish and shellfish consumption because of high associated health risks. In response, several bills proposing mandatory fish inspection legislation were introduced in Congress.

Numerous Federal and State agencies currently implement mandatory and voluntary inspection programs. These programs regulate fisherman, processors, and various marketing channels and test water habitat (Dicks and Harvey, 1989). The focus of the new inspection bills is to place one Federal agency in charge of seafood inspection, set up the principal components of the inspection system, and determine how the inspections will be funded. The relative costs of these bills to aquaculture, the capture fisheries industry, and importers have not been determined.

Lack of Data: More information on the size, extent and potential of aquaculture is needed. The National Agricultural Statistic Service (NASS) currently surveys producers and processors in the catfish industry and producers in the trout industry. Some states such as Florida have conducted state-wide surveys of aquaculture enterprises. In the current national level surveys, data collection is concentrated on aquaculture enterprises and may omit recreational and fee-fishing enterprises. Also, several large industries are not currently surveyed including the bait fish and crawfish industries. The limited data on aquaculture enterprises complicates quantification of the size of the industry, leading to highly conservative estimates. These conservative estimates may detract from the need to allocate scarce research resources to aquaculture. The allocation of resources into developing and improving U.S. aquaculture could provide higher quality, lower cost fishery products to future consumers. Growing world population and declining stock of wild catch species will lead to higher prices and the necessity of allocating greater resources to aquaculture in the future.

Conclusions

The growth in aquaculture output in the 1980's was fueled by the rapidly increasing demand for fishery products. Poor outlook for traditional agricultural commodities (ie. corn, wheat) and low

input prices enabled new producers to gain sufficient capital for expansion. Both the increasing demand and low input costs may be changing course in the 1990's. If this occurs, aquaculture will need to increase production and processing efficiency to maintain or increase market share.

Improvements in production and processing will require research and cooperation between industry, government, and research institutions. Increasing government budget constraints may reduce the likelihood for support of the long term aquacultural research necessary to develop new species or production technologies.

Declining world fish stocks and increasing world population will increase the reliance on aquaculture over the next decade. The short term stability in supply and demand which may occur over the next couple of years may reduce the perceived need to develop a domestic aquaculture industry. Insufficient research and development resources, based upon the short term outlook, may reduce the domestic aquaculture industry's ability to capture a share of the future market.

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MANDATORY SEAFOOD INSPECTION

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Twenty-two years ago, the late Senator Philip Hart spoke at the annual convention of the National Fisheries Institute and outlined his belief that there was need for a better seafood inspection program. Senator Hart subsequently introduced legislation which was investigated in hearings, actually passed the Senate, but did not make it into law.

At the time, the seafood industry was struggling. The Soviet and other foreign fishing fleets were decimating our resources; the Catholic Church had just changed its dietary rules, allowing meat to be eaten on Fridays; and a well publicized incident involving botulism in smoked Michigan whitefish had scared consumers.

A lot has changed since 1967. The Magnuson Fisheries Conservation and Management Act provided means in 1976 to control foreign and domestic fishing pressure on the resources. Fish has become an everyday, not a Friday, food, and the previously unknown potential of botulism in smoked fish is safeguarded by processing and handling procedures.

The most dramatic change since 1967 has been the growth of the fish and shellfish in the American diet. In 1967, per capita consumption was 10.6 pounds edible weight. Last year it was 15 pounds, an increase of more than 46 percent. Even more significant is the growth of fresh and frozen products, as opposed to canned. Here the increase was from 5.8 to 9.6 pounds, a 65 percent increase.

For most consumers, fish and shellfish is no longer an occasional food, or special treat. Seafood is a full fledged every day choice of consumers, along with beef, pork and poultry. The public realizes that fish provide excellent nutrition...low fat, low cholesterol and easily digested proteins.

These characteristics, together with the unique tastes and flavors of properly prepared seafood, and the desire for variety,

strongly suggest that seafood consumption will continue to grow.

Such growth is good for the country. Health experts advise that heart disease can be alleviated by dietary changes which include more fish. Improvements in public health have direct benefits for the country. Certainly, quality of life is improved with variety; and the nation's economy benefits from a vibrant primary industry which creates income and jobs from renewable natural resources.

These benefits will accrue in the future only if consumers have full confidence in the safety, wholesomeness, and integrity of fish and seafood products. The National Fisheries Institute believes this confidence is in jeopardy and will be maintained and strengthened only through an improved regulatory system which includes mandatory inspection.

The impact on the economy of the fish and seafood industry is far more extensive than most people realize. A recent study conducted by the National Fisheries Education and Research Foundation shows that direct, indirect and induced economic impacts attributable to fish and seafood exceed \$80 billion annually. More than one million full-time equivalent jobs are generated. These are big numbers and reflect the myriad pathways on which fish products move from the dock to the dinner table. The study shows that consumers pay about \$30 billion annually for fish and seafood with about two-thirds being consumed in restaurants and other food service establishments.

While many of the economic impacts occur in the metropolitan areas, since that is where the value of distribution and service is realized, the primary economic impacts are generated in rural areas where jobs are needed.

The seafood industry is very trade dependent, for both our markets and supplies. More than 3 billion pounds of product worth \$5.5 billion were imported last year. This was slightly greater than imports of meat and poultry in volume, but substantially higher in value. As for exports, fishery products soared in 1988, exceeding one billion pounds and \$2.1 billion, making the U.S. the world's largest fish exporter. The value of fish exports exceeds that of meat and poultry.

It is evident that seafood is a major component of our nation's food supply-- a component important enough to the consumer and the economy that our ability to maintain the confidence of consumers here and overseas must be protected for the common good.

Contrary to popular opinion, the fish and seafood industry is not without regulation. We are subject to the Food, Drug and Cosmetic Act and the Fair Packaging and Labeling Act. These laws

are enforced by the Food and Drug Administration. Enforcement includes plant and product inspections and port-of-entry inspections for imports. The extent of this enforcement activity varies, but it does exist and has been documented in such reports as the General Accounting Office study of August, 1988 on Seafood Safety and the responses of the FDA to questions raised by the Chairman of the House Subcommittee on Oversight and Investigations of the Energy and Commerce Committee.

Various states also enforce their laws relating to food safety. In respect to molluscan shellfish, the coastal state governments, in coordination with the FDA, operate the National Shellfish Sanitation Program. Finally, the U.S. Department of Commerce provides a for fee voluntary inspection and grading service under the Agricultural Marketing Act of 1946.

The actions of overseas governments also have a bearing on seafood safety. Such major supplier nations as Canada, Norway and Iceland, among others, have seafood inspection programs specifically designed for fish and seafood.

The problem is not that there is no inspection system, but rather that the present system is inconsistent and incomplete and thus does not provide the level of assurance demanded by the public. This demand is strong. Recent surveys by the Roper Organization and the Food Marketing Institute show that fish ranks extremely high among the products about which consumers are most concerned. Media analysis and editorial opinion also call for a mandatory seafood inspection program. A large part of the current demand that more be done to assure the safety of fish stems from concern over the marine environment which has suffered from decades of toxic substance discharge, substandard sewage treatment, oceanic sludge dumping, pesticide run-off, and oil spills. While there is little evidence to show that present levels of toxic chemicals in fish have actually caused illness, there remains a nagging concern over the long-term impacts. Examination of the data on actual illnesses and deaths attributable to seafood, and analysis of the data's meaning, do not show widespread problems. The GAO report and documentation by the National Marine Fisheries Service and the FDA attest to this. A larger study now in progress at the National Academy of Sciences can be expected to shed more light on the extent of real problems attributed to seafood as well as to offer recommendations on how these are to be corrected.

It does appear that the major sources of illness attributable to seafood are those caused by contaminated molluscan shellfish when eaten raw; by ciguatoxic reef fish, a problem confined primarily to our tropical island territories; and scombroid toxic fish, a problem unique to a certain class of fish in which histamine can build up if the product is mishandled.

It is important to note that the seafood products which make up virtually all of consumption exhibit an excellent record of safety. It is equally important to note that many of the actual cases are the result of natural environmental conditions, the ciguatoxic fish and some of the raw molluscan shellfish to be specific. Also, although many fish are caught recreationally, the impact of sports caught fish in the illness statistics is not known.

While the degree of risk of illness attributable to seafood can be, and is, debated, NFI believes that the regulatory system should be intensified in all areas in which any type of statistical evidence of illness exists. Certainly, a new regulatory scheme must specifically address the problems of ciguatoxin, scombrototoxin and the unique natural toxins, bacteria and viruses at times found in mollusks.

We do not wish to minimize or discount the problems currently affecting relatively small percentages of our products. However, our basic position is that a new system is needed to anticipate rather than react to problems. Such a proactive program is needed because of significant changes in occurring in our industry. Included are:

- o Emergence of new species of fish on the market from new areas of the world. One of the attributes of the industry is the variety provided by new products, orange roughy, dory, hoki to name a few.
- o Emergence of processing operations in developing nations. Many products are now processed, some into ready-to-eat form in such far away places as Taiwan, Thailand, the Philippines. The present system provides no means of checking the sanitary and other procedures in these locations other than at the U.S. port of entry.
- o Emergence of aquaculture as a major source of products. Farm-raised fish is reported to be the fastest growing sector of agriculture in the U.S. It also is booming in other parts of the world. Farming fish involves the use of medications and feeds which should be monitored.
- o New processing technology. One of the contributors to per capita consumption increases has been the surimi based family of products. This involves high tech food science; many additional innovations such as the mixing of fish and animal proteins can be expected. But new technology also opens the door to new potential problems.
- o Growth in fully processed, ready-to-eat seafood.

Social changes which provide less time for traditional home cooked meals and a growing shortage of labor for food service operators are encouraging the development of more and more ready-to-eat, or heat-and-serve products. These provide value to the consumer. However, since they are eaten without further cooking, their preparation in a processing plant demands scrupulous attention to sanitation and avoidance of cross-contamination. Specific good manufacturing procedures must be developed and employed.

- o Processing at sea. Many products are processed at sea, out of easy access by inspectors. A new system must address this type of operation.
- o Recognition of new bacteria and viruses. It seems that scientists are learning rapidly about the pathogenicity of certain bacteria and virus. *Listeria monocytogenes* and *vibrio vulnificus* are two of the pathogens now under scrutiny. As more causative agents are discovered or better defined, procedures and regulations will have to change.
- o Continued environmental concerns. The persistent use of the oceans as a convenient disposal site is a major concern. Fish in certain areas will absorb trace amounts of various industrial and agricultural toxic substances. The presence of such substances in fish is not of short term significance. However, many health professionals are concerned that long-term exposure to these chemicals, even in trace amounts, constitutes undue risk to consumers. This concern poses real difficulties for the commercial industry, in that constant attention to the issue is raised by environmental and other groups seeking the very important and necessary changes in water quality practices. Health authorities feel obliged to warn recreational anglers about the long term risks of heavy consumption of certain species caught in polluted waters. While commercial fishing is often prohibited in these waters, and the warnings have no relevance to commercial product, the widely publicized warnings are generalized and cause apprehension in the minds of consumers.

These concerns prompted the National Fisheries Institute in 1985 to revive legislative efforts to improve the seafood inspection system. Our decision came after extensive debate, since few in industry want to invite greater regulation.

NFI, however, believes that the real problems, the perceived

problems, concerns over economic violations of law fostered by rising demand, and the problems on the horizon could be addressed only by a strong governmental program. The decision was not accepted universally within the industry. Many plant operators feared the unknown and did not want to endorse a change in regulation without knowing what was being planned.

NFI's first action was to ask Congress to mandate the design of a seafood inspection system based on the Hazard Analysis Critical Control Point (HACCP) concept recommended by the National Academy of Sciences. The design of this seafood surveillance program has been underway for the past two year. It includes the National Academy of Sciences study referenced earlier.

The industry is contributing considerable time and effort to see that this study is completed as soon as possible, with hundreds of industry professionals devoting thousands of days in government workshops and meetings. This work must be completed. We believe it will provide the integral mechanism for a new regulatory program. The HACCP concept is not new. It is already incorporated in the FDA's low-acid canned food regulations. Very simply, HACCP is a safety-quality assurance system that provides for monitoring of those steps in a processing operation which have the potential of causing hazards. A separate HACCP procedure must be established for each different processing operation, i.e., one for a cooked shrimp processor, another for breaded shrimp, and so on through the entire range of processes in the industry.

The procedure employed is to:

- o Define the operational steps;
- o Identify the hazards;
- o Determine the preventive measures for each hazard;
- o Identify monitoring procedures for the hazard preventive measure;
- o Assign relative importance for the hazards;
- o Define the critical control or monitoring points; and
- o Identify the records necessary to assure compliance.

We believe that the HACCP systems should be mandated as the key regulatory tool of an improved inspection system. We also believe that the overall comprehensive seafood regulatory system should include the following elements:

- o Certification of Plants. This would involve an initial inspection of facilities and procedures; in short, assurance that the facility has the capability of producing wholesome product. The facility requirements would have to be specific to the type of processing and species handled. Certification would involve a

registry of plants.

- o Surveillance of operations. This aspect would require HACCP procedures by the plant operator and inspection to verify plant adherence to these on an as needed basis by the designated authority. The intensity of this surveillance would vary according to the degree of risk involved in the process and the record of the operator.
- o Surveillance of Imports. Foreign governments wishing to have products imported into the United States would be encouraged to establish regulatory programs which would provide assurance of compliance to U.S. regulations. The level of sophistication in these systems would be measured by site visits and port-of-entry monitoring.
- o Increased molluscan growing water monitoring and enforcement. The current shellfish program provides the base for improvements in this very important area. Additional research to improve the reliability of the system is needed as well as funding to the states for increased monitoring and enforcement.
- o Toxic substance monitoring. While current levels of contamination due to industrial pollution have not had widespread impact on the safety of coastal and oceanic resources, there is a need for continual monitoring of the resources for toxic substance residues. This effort on both domestic and imported product would serve to trigger compliance efforts through the HACCP programs and port-of-entry inspections if and when the surveillance shows persistent presence of toxins at levels of concern.
- o Economic violation enforcement. The inspection system should include monitoring for economic abuses. Under the present regulatory system, economic violations do not receive intensive enforcement efforts. Since certain economic violations can result in safety concerns, we believe there is need to provide increased enforcement capabilities in this area. Increased enforcement is necessary also to assure fair dealing and to overcome any lapse of consumers' confidence as to receiving what is being paid for.

In summary, we see an improved regulatory system combining a series of new or expanded inspection and self monitoring efforts. The system would be developed and implemented consistent with the risk-based HACCP concept and would be mandatory.

This proposed system should be designed to meet unique concerns of seafood. It would be different than the carcass-by-carcass examinations of meat and poultry, and certainly different than regulatory systems for dairy products and other foods. Its establishment is a large task, one which will require a phase-in for both the industry and government.

The government agency chosen to establish such a system will face a very challenging task. The harvest and marketing of live lobsters is far different than the processing of Alaska pollock into imitation crab meat. Fish smoking requires a different code of practice than marketing fresh haddock fillets, and on and on. Government-to-government understandings must be reached with more than 80 foreign governments. The number of import shipments exceeds 160,000 annually at scores of ports of entry--all the way from northern Minnesota and Michigan to Nogales, Arizona, as well as the more readily expected seaports. There is need for rapid response. Perishable products cannot wait. And a single container of lobster tails, as an example, can have a value in excess of one half million dollars. Undue delays are very expensive. The plants are very often in remote locations and are often small and seasonal.

There are three federal agencies which could be given the seafood inspection task--the Food and Drug Administration; the Department of Commerce; and the Department of Agriculture. Each of these agencies offers strengths and each has some weaknesses. The Food and Drug Administration already has much of the legal authority needed. It has impressive credentials and expertise in the fields of microbiology, virology, parasitology and so on. It already inspects foods at the ports of entry and administers the National Shellfish Sanitation program. It also works closely with state health agencies.

On the negative side, FDA's other responsibilities are expanding and it has had difficulty in obtaining funding to fulfill them. Its matrix type of organization may be inconsistent with a dedicated program. It seems to operate in a crisis mode and lacks an overseas capability in food inspection. In these circumstances, a dedicated large seafood program could create an imbalance with FDA's other functions.

The Department of Commerce has impressive fishery expertise in the National Marine Fisheries Service. It has a core group of inspectors, some laboratories and standard setting procedures. It has daily contact with the industry. It has some authority to enforce foreign and state fish laws and is the federal fishery resource management agency.

On the other hand, the Department of Commerce also has had trouble with funding for expanded responsibilities and obligations to protect species and manage fisheries. We would

also question whether consumers would have confidence in the Department as a food safety authority.

As is well known in this forum, the Department of Agriculture has over 80 year's experience in food safety. It has the managerial infrastructure in place to handle large scale programs. It has respected scientific capabilities and the confidence of consumers. It also has the lead federal role in aquaculture, which is a rapidly growing source of supply. USDA has established ties to overseas governments through its present inspection program and is heavily involved in export enhancement. A large-scale program would not be out of proportion to the rest of the agency.

Negatively, USDA lacks extensive experience with fish. A fish program might be overwhelmed by meat and poultry activities. The idea of continuous inspection may be so ingrained in the USDA that a HACCP program may not work. USDA has no tie to the management of wild stocks of fish.

The National Fisheries Institute in early discussions of the issue came to the conclusion that the most logical agency was the Department of Agriculture, with the assumption that the existing DOC inspection program would become a part of USDA. There are several reasons for this conclusion, but the most important ones were USDA's experience with large-scale operations in the field and its overseas capabilities.

In this discussion we noted several times the need for ties to resource management. By this we mean the ability to prohibit commercial fishing in areas or for species which fail to pass muster with toxic substance residue tolerances. The concept is not new. Presently, molluscan shellfish safety is assured by monitoring and regulating shellfish growing waters. The same approach is used for some finfish at the state level. For example, New York restricts the commercial harvest of fish from areas contaminated with PCBs.

We believe that controlling harvests is an effective way of achieving compliance to environmental contaminant tolerances. Once fish are caught, it is usually economically prohibitive to separate fish in compliance from those with excess residues. Accordingly, when problems are identified, harvest restrictions should be imposed.

Current law governing the presence of environmental contaminants in fish needs review and, in our opinion, change. Presently, toxic substances, pesticide residues, natural toxins are governed by different sections of the Food, Drug and Cosmetic Act, none of which was written with the presence of residues in fish in mind. The idea that fish is adulterated because of presence of an unregistered pesticide suggests that pesticide

manufacturers will register their chemicals for use on fish. This is not plausible.

Another section suggests that different criteria be used to determine tolerances if the residue is naturally occurring as opposed to being an additive. What is natural in these circumstances? The activities of mankind have changed the marine environment over thousands of years. It would seem that the marine environment, with all of its components, is the way nature is today. A new section of law is needed to address environmental contaminants in fish products.

The industry recognizes that the move to more intense regulation will not be simple or painless. But, the record shows that the U.S. fish and seafood industry has matured greatly since the time Senator Hart first broached the subject of inspection more than 20 years ago.

The very introduction of legislation by Senator Hart, and subsequent bills introduced by others, caused a reexamination of practices in the industry with resulting improvements in quality and wholesomeness. These improvements have contributed to the growth the industry has achieved. It's time to complete the work begun by Senator Hart and to move forward on a mandatory fish inspection program as soon as possible.



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

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U.S. AQUACULTURE RESEARCH NEEDS

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The art of fish culture has been practiced in China for 3,000-4,000 years. The science of aquaculture has been practiced in the United States for only a few decades. In this country the scientific approach to fish culture was first applied to the culture of coldwater fishes. This original work was directed towards saving the salmonid stocks in the Northwest which were threatened by dam building and heavy fishing pressure. The importance of this early salmonid work is still undeniable. Research in nonsalmonid species lags years behind, and is still largely guided by, salmonid research.

With catfish, industry growth and scientific research have largely progressed concurrently. Catfish farmers are an innovative group, and because of this, much of the research effort has been expended to verify what the farmer has already figured out, or to disprove some "old wives tale" that has developed along the way. Priority research effort has been directed towards problems already causing substantial difficulties in the industry. Due to extremely rapid industry expansion, researchers have often remained in a "keep-up" and in some cases a "catch-up" mode. Only recently has the research on catfish culture reached the point of being able to anticipate problems, rather than addressing existing problems.

This situation is even more pronounced for emerging and alternative species whose basic requirements and tolerances have not yet been determined. Commercial interest often develops before enough information is in place from which to plan culture strategies. This can do immeasurable harm to the development of some species and culture techniques. Investors have a long memory for failure.

A few general statements seem in order. Aquaculture is the most intensive form of agriculture known. Aquaculture has the smallest research base and shortest research history of

any agricultural enterprise. Aquaculture is one of the fastest growing sectors within U.S. Agriculture, having increased over 20 percent annually since 1989. Aquaculture has already outrun its research base for most species and production systems. The research effort started late and has not caught up with the industry, nor will it do so at current levels of support.

This situation is made worse by the nature of aquaculture. Aquaculture is not a distinct discipline but combines aspects of various sciences including biology, chemistry, limnology, ecology, etc... The extreme interrelatedness inherent in an aquatic environment confounds the factors being examined, complicating the task of the aquaculture researcher. Much of the nutrition information such as digestibility or metabolizable energy which is fairly straightforward to determine in most animals is extremely difficult if not impossible to determine in aquatic animals. Also, as if these problems were not sufficient, relatively few colleges and universities have programs leading to degrees in aquaculture or with an emphasis on aquaculture. However, this situation has begun to change.

The cost of aquaculture research is relatively high because of the need for ponds and associated equipment. Most fish production experiments require at least a year to design, conduct, analyze, and report. Usually, however, much more time is required, meaning relatively few studies are completed yearly.

Production experiment techniques are not nearly as standardized in aquaculture as they are in other forms of agriculture. In traditional agriculture, production research is normally conducted under a set of standard conditions using a plant or animal whose genotype and phenotype are well known. This is not the case with the aquaculturist. Most fish are only a few generations from the wild and for many emerging species wild broods are still used. Genetic variation may be considerable. Also, standard conditions are extremely difficult to develop and maintain in aquatic situations. Identical side by side ponds filled from the same water source can develop different plankton blooms causing differences in water chemistry and availability of natural foods.

As you can see much needs to be done. Because of the level of need, it is important that the research effort expended be directed to produce the maximum benefit. It is important that the scientist be allowed to be creative but at the same time must do work that is important. To know what work is needed requires contact with producers. To this end,

extension workers can be an extremely valuable asset. The same channel that carries research results from the researcher to the farmer can serve to funnel research needs from the farmer back to the researcher.

Dr. Wayne Shell at Auburn University offers some guidelines on the allocation of research resources. Most research effort (approximately 75%) should continue to address immediate problems. Many people would say that eventually you should work out all of the day to day problems. However, production is governed by a complex series of factors. As one constraint is overcome production will increase until the next "bottleneck" is exposed, then it must be dealt with. This is a dynamic and continuous process.

Approximately 20% of the research effort should be directed toward problems anticipated 3-5 years in the future. This is the portion of the research needs that probably has received the least attention due to extreme demand from immediate problems.

Five to ten percent of the research effort should be basic in nature. This type of research is directed towards understanding the basic process underlying the applied research. This portion can come to monopolize too much of the research effort. Basic research generally requires less facilities, is less expensive, and is probably more professionally rewarding. Results are easier to publish from basic research and will garner more acclaim from fellow scientists. However, the effort applied to basic and applied research must be balanced and the two approaches should complement each other.

A major development in the relationship between research and aquaculture development has been the creation of six U.S. Regional Aquaculture Centers. These centers were authorized under Title XIV of the Agriculture and Food Act of 1989 and the Food Security Act of 1985. They are intended to address regional aquaculture needs through research and educational extension, for the development and enhancement of the aquaculture industry.

The centers encourage cooperative and collaborative research between organizations and are intended to complement and strengthen existing aquaculture research programs. All Land Grant, Sea Grant, state, territorial, and federal institutions as well as non-profit private research organizations with demonstrated expertise and capabilities in aquaculture are eligible to participate. The 3.0 million dollar appropriation to form the centers is considered by Congress as the vehicle for USDA to implement the National Aquaculture Development Plan released in 1973.

In preparing this presentation I contacted all six regional centers to solicit their input on aquaculture research needs for the U.S. By nature, each of the centers had specific needs defined by their regional roles. To cover or condense all the needs defined by the regional centers was beyond the scope of this presentation. The best approach appears then to be a review of the general categories of aquaculture research, illustrated by examples drawn from regional research priorities.

Nutrition and Diet

Development of feeds that are efficient and economical is dependent on knowledge of nutritional requirements. As the production of a species intensifies, the need for more precise nutritional information also intensifies. Efficient feeds are extremely important since feed costs account for 50% or more of production costs in most aquacultural production. Also, nutrition is normally one of the first problems addressed in the development of a new species.

Currently, efficient high quality feeds exist for catfish, trout, and salmon. This represents rapid progress, especially for the catfish, due to its short research history. Much of the ability to move rapidly can be attributed to the similarity of fish nutrition to the nutrition of other more thoroughly studied monogastric animals. However, much progress is due to energetic creative researchers working on the unique problems of assessing nutritional status in an aquatic environment.

Problems to be addressed in the future will largely be in the realm of refinement. Salmonid feeds are manufactured based on open-formulations (i.e. different ingredients can be substituted based on ingredient price and availability). Catfish diets are largely produced from fixed formulations (i.e. a set ingredient list, regardless of price). With increased availability of information on nutritional requirements, the catfish industry could come to rely less on fixed formulations and thereby buffer feed prices from the price fluctuation of ingredients.

Future areas of investigation in fish nutrition will probably be directed towards production of more economical feeds and interrelationship of feeds, fish, and environment. Specific areas to be addressed, particularly in catfish, include; (1) evaluation of new ingredients (2) interaction of feeds and product quality, (3) interaction of nutrition requirements and environmental situation (cages, raceways, ponds), (4) development of a reference diet for standardization of research techniques, (5) and development of diet formulations specific for different life stages.

Genetics and Breeding

Genetic research and breeding programs have been major contributors to production improvements in traditional agriculture. At least 30 percent of the improvements in rate of gain and feed efficiency in traditional livestock industries can be attributed to genetic improvement. Aquaculture has not yet benefited from genetic improvement to this degree. However, since efficient feeds are now available for most species, genetics probably has the most potential to contribute significantly to aquacultural production in the coming decade.

Significant developments in genetics have occurred in recent years. Domestic trout strains with different spawning seasons are now maintained so that eggs and fry are available year around. In catfish, researchers at Auburn University have recently released a select line of channel catfish capable of growing 15% larger on the same amount of feed and have produced a hybrid (channel x blue) catfish which grows 20% faster, with better dressout, and increased seinability. The insertion of a human growth gene into carp also represents a significant step into the biotechnology approach to fish genetics. Research in aquacultural genetics will be greatly aided by a recent \$1.3 million grant to Auburn for the development of a warmwater fish genetic engineering and breeding center.

A committee on Aquaculture Genetics and Breeding was formed by the University of California, Davis and the U.S. Department of Agriculture to assess the status needs of aquacultural genetics in the U.S. The committee published its' findings on research priorities and recommendations in 1988. The committee identified four central pathways of genetic research critical to the advancement of aquaculture genetics and its application to production aquaculture. The four pathways are:

1. Basic research on aquacultural genetics to provide fundamental knowledge into practical breeding programs.
2. Development of biotechnology specific to aquaculture that will lead to innovative breeding programs as well as advanced research approaches.
3. Use of traditional animal breeding approaches in quantitative genetics and incorporation of that knowledge into practical breeding programs.

4. Development of domesticated stocks suited for commercial production systems.

The committee also selected a fifth support pathway considered to be of critical importance:

5. For other pathways to function, the conservation of genetic resources to insure a continuing source of genetic material for future needs is considered imperative.

The committee found that hindrances to aquacultural genetics research has largely been fragmentation of funding programs and the short-term nature of budgeting cycles. Genetics projects require relatively long-term commitments (7-15 years). Another hindrance has been the lack of trained people. There has been insufficient funding for graduate student research and a lack of training opportunities for those seeking training.

Production improvements by genetic improvement appear to hold real potential and to be very similar to improvements achieved by livestock and poultry. Over the past 15 years, the growth rate of Norwegian salmon has increased an average of 3.8 percent per year with comparable gains in feed efficiency, survival, and carcass quality.

The relatively late development of aquaculture has the same inherent disadvantages in aquacultural genetics as in other fields of aquaculture research. These include the lack of fundamental knowledge of aquaculture species, lack of a strong research support base, and limited numbers of highly trained scientists. However, late development can be viewed as having some advantages. Since others have gone before, the aquacultural geneticist has the advantages of contemporary technology and direction based on experience gained in genetic research on other animals. Areas of immediate concern for genetics researchers include not only growth rate and feed conversion but also disease resistance, water quality tolerance, manipulation of gender, processing characteristics, and product quality.

Disease and Health

As long as fish have been held in confinement there have been problems with fish diseases. As the density of animals in culture systems has risen, disease problems have intensified. It is estimated that 10 percent of all cultured catfish are lost to infectious diseases and that more than half of total fish losses are due to disease. Reported disease cases in the Southeast increased 400 percent between 1972 and 1983.

Although disease problems continue to increase the "arsenal" of drugs and chemicals remains very small for the aquaculture industry. Currently, only 9 therapeutics, 4 disinfecting agents, 6 water-treatment compounds and dyes, 3 anesthetics, 15 herbicides or algaecides, and 2 pesticides are approved or registered for use in aquaculture. Only two antibacterials are currently available to fight bacterial disease, leaving drug resistance as a looming problem. The lack of approved compounds stands as a significant obstacle to the continued development of aquaculture. During the past 10 years, only two new compounds have been approved. With two approved compounds no longer being available, this represents a net change of zero. To address this problem, the Joint Subcommittee on Aquaculture (JSA) appointed a Task Force which has identified 24 compounds urgently needed for the rapidly growing aquaculture industry. It was estimated that approval of these compounds will require funding of \$3 million annually for a five-year period. However, according to the aquaculture industry, at least \$45 million would be saved annually if these compounds were available for use. This represents a significant return on investment.

The best disease treatment is prevention and this is especially true in aquaculture. Not only are few drugs available but pressures against their use, or for more responsible use, grow daily. One approach to prevention is vaccination. Rapid development in the technology of fish vaccination has occurred, but is primarily limited to salmonids. Immunization in catfish has not progressed as rapidly but is considered one of the priority areas of research by the Southern Regional Aquaculture Center.

Management and Production Systems

Many, if not all, of the general areas of research are inextricably interrelated. A prime example is the interaction of disease, management, and water quality. These factors are certainly interrelated with profitability. Management practices currently followed by some catfish producers; such as, stocking 10,000 fish/acre, feeding in excess of 200 lbs/acre/day, and not draining ponds may certainly increase the risk of disease. The question is does the increased production justify the added risk. An economically viable aquaculture management scheme must maximize production, while minimizing the chance of catastrophic losses.

Significant developments in management and production systems have occurred in catfish and salmon in recent years. In catfish a continuous production management strategy has developed. In the past fingerlings were stocked in the spring, raised during a single growing season and harvested in the fall or winter. The pond was then drained. This system causes an inherent seasonality of fish availability, does not fully utilized the carrying capacity of the pond during most of the year, and requires the total refilling of ponds yearly.

With the continuous production strategy, several sizes of fish are maintained concurrently in the same pond. Harvestable size fish are selectively seined as they attain market size. These fish are then replaced by a like number of fingerlings. Ponds are operated indefinitely without draining. This makes fish available year around, the pond is maintained at near maximum capacity during most of the year, and water demand and pump costs are reduced.

In salmon the advent of net-pen culture has greatly increased production in recent years. Private production of salmon increased over 70% during 1988 and world production of salmon is expected to more than double in the next 10 years.

Research into innovative culture systems should be continued. Development of moving water cage systems ("floating raceways") could expand production to existing large impoundments. The development of closed recirculating systems would allow production in regions previously considered unsuitable. However, much research on individual components (biofilters, solids removal, aeration) is needed. Also, the site specific integration of correctly sized components will require significant research effort. Valid comparisons of the economics of different management and production schemes are also needed. Closed-recirculating systems are approaching economic feasibility but still must be economically measured against pond production and raceway production for some species. For catfish the relative risks and benefits of continuous and batch production need to be evaluated. For many species management questions as basic as what size to stock and how and when to harvest remain to be answered. Also, research into predator control is needed. An estimated 15 million catfish fingerlings were lost last year to migratory birds.

Water Quality

As management techniques have increased stocking rates, and nutrition research has improved diets, a constraint on production had to be reached. Water quality is considered by most aquaculturists to be the main problem facing the continued growth of the industry.

Trout are usually raised in flowing-water systems and the flow-rate of clean incoming water largely determines production capacity. Production increases in trout in recent years have largely been due to development of oxygen supplementation techniques in raceways.

Most commercial catfish culture is conducted in static water ponds. Production constraints in catfish ponds have also been pushed back by aeration. Densities have increased from 2000-3000 pounds per acre to 6000-10,000 pounds per acre. However, water quality considerations remain the most severe restriction on production intensification.

The accumulation of nitrogenous waste products result in the occurrence of potentially toxic concentrations of un-ionized ammonia or nitrite. Also, metabolic wastes accumulate in pond systems causing plankton blooms which can exert tremendous oxygen demands and cause off-flavor problems in the fish. During summer months as high as 80% of catfish production ponds can be off-flavor, rendering a like percentage of the fish unsalable. The effects of these numbers on product availability and cash flow should be obvious.

The goal of water quality management is to regulate the chemical, physical, and biological environment of the culture system so that fish are maintained under optimum conditions for growth. Many of these constraints can be addressed but economic conditions severely limit their applicability under commercial conditions. This fundamental point--water quality management procedures must result in economic benefit--is frequently lost to many researchers.

Currently, both trout and catfish production are largely concentrated in relatively small geographic regions. Concentration has provided some benefits in the logistics of feed procurement and processing for both industries. Although the water resources that are the basis of these industries are large, they are also finite. Dependence on these natural resources will eventually limit the growth of both industries within their region of concentration.

In the catfish industry, 75% of total U.S. production is accounted for by the 18% of U.S. producers located in the "Delta" region of Mississippi. However, the aquifer that provides water to these producers has been dropping approximately 1.5 feet per year. Depletion of this resource could not only limit future expansion in the region but could actually cut production if the trend is allowed to continue.

One approach to water quality research again illustrates the interrelatedness of components in aquaculture production. Nutrition research in salmonids is addressing water quality considerations through nutrient density and feed conversion. The more efficient the feed utilization and retention the less waste makes its way to the water. For example, by reducing the feed conversion ratio from 2.0 down to 1.3, the amount of nitrogen and phosphorus lost to the water is cut in half. This could be very important in most culture systems including ponds, raceways, and especially closed-recirculating systems.

Research areas that need to be addressed include maximizing the efficiency of water utilization, causes and cures for off-flavor, characterization and reduction of effluents, techniques of aeration and biofiltration, and effects of management/water quality interactions on profitability.

Product Quality

Product quality has received additional attention in recent years and is of vital concern to producers and processors. In the catfish industry excessive fat levels in fish and associated shelf- life problems (which constrain expansion into new markets) have been a major concern. In fact this problem is currently one of the priority areas of research for the Southern Regional Aquaculture Center. A three year project funded at a total of \$825,000 and involving 10 universities is examining the effects of nutrition and dietary components on these problems.

Recent studies in both salmonids and catfish have shown that Omega-3 fatty acid levels can be increased by dietary manipulation. These findings have important health and marketing implications. However, additional research is needed to determine the effects of increased omega-3 levels on the taste and storability of the products. Other areas of research needs include new product forms, value added products, effects of further processing on shelf-life, and additional work on the effects of water quality and individual feed ingredients on product quality.

Economics and Marketing

The U.S. aquacultural industry has provided alternative employment and income opportunities to farmers and rural communities, new markets for the domestic supply of fishery products, and reduced the U.S. trade deficit. Aquaculture offers farmers diversification through a wider use of their resources. However, not every aquacultural endeavor is profitable. There is considerable economic risk and uncertainty associated with aquaculture ventures. The uncertainty is largely due to the many unknowns that exist in the developmental stages of a new industry. When considering an aquaculture venture there are technological uncertainties, regulatory uncertainties, input and market uncertainties, as well as capital constraints and shortages of trained individuals. There has been little done to evaluate the profitability or economic risks of aquaculture ventures, especially outside of traditional production regions. Also, little work has been conducted on new management schemes, new species, or different culture systems. In addition to these limitations, many aquaculturists are unfamiliar with procurement of capital and marketing options and do not have the background to develop the business and marketing plans necessary to attract investors and other sources of support.

In the Mississippi catfish industry, which has received more extensive study than most, economic information is still considered a very high priority. Marketing/Economics and Statistical Database was one of the first three categories funded (\$350,000) by the Southern Regional Aquaculture Center.

Economic considerations should be a component of all of the research needs set forth in this paper. However, areas of particular need include: 1) Determination of the economics of production and associated economic risks by region, by species, and by production system. 2) Identification of policy impediments and incentives for expanded aquaculture development by region, by species, and by production system. 3) Investigation into the effects of market form and market outlet. 4) Development of a "production breakpoint" for processing feasibility during early production development. 5) Investigation of the feasibility of cooperative purchases and sales during early development, especially in regions with less localized production.

New Species

Development of new species is required for aquaculture development in regions outside of, and for diversification within, traditional production areas. Currently, nearly 90 percent of the volume of edible fishery products from U.S. aquaculture is accounted for by four species: catfish, crawfish, salmon, and trout. Numerous other species such as tilapia, striped bass, redbfish, sturgeon, carp, walleye, and paddlefish are being produced in limited quantities. Aquaculture of mollusks (clams, oysters, and mussels) is currently limited but showing strong potential for growth.

Development of each new species requires availability of seedstock, feeds, culture systems, management schemes, and markets. Any missing link halts development until research can fill in the gap. In this way, development of each species represents a microcosm of aquaculture development in general. Although development of a new species can be guided by experience with successful species, each represents unique challenges. For example, work on the freshwater prawn at Mississippi State University has shown promise and progress in the intensification of production, utilization of feeds, and profitability at harvest. However, development has been impeded by reliable production of seedstock.

In 1983, the National Aquaculture Development Plan identified a total of 36 species groups considered to have aquaculture potential and developed plans to direct research efforts to close gaps in scientific and technical knowledge for

12 of these groups. However, detailed plans were not developed for many of the species now considered to be of interest in several specific regions of the U.S. Research priorities of the North Central Regional Aquaculture Center (NCRAC) identified walleye, northern pike, muskellunge, sturgeon, yellow perch, sunfishes, and Atlantic salmon as species of interest, none of which were identified by the National Aquaculture Development Plan. Each one of these species is considered by NCRAC to offer commercial potential within the region which could exceed the more well-known species.

Research needs for new species require not only identification of potential species but research specific for that species in each of the research categories previously discussed. For even minimal development of a new species research is required in the areas of broodstock domestication, reliable fingerling production, nutritional requirements, diet development, harvest techniques, legal constraints of production and sales, economic profitability, and marketing determinations.

Summary

Aquaculture is developing at an extremely rapid pace. Even in species which have received more research effort and have longer culture histories (such as trout, salmon and catfish) production has largely expanded beyond the existing data base. The rate of industry expansion has dictated that research resources be directed toward existing problems so that the extreme need for information continues.

Although fish are fast growers and can be raised at high densities, the actual pace of research is similar to other agricultural crops. The only method of increasing output is to increase resources, so that more studies can be conducted concurrently.

Major areas of research needs for existing species are nutrition and diet, genetics, disease and health, management and production systems, economics, and product quality. The transfer of these currently produced species into new production systems or new regions will require reassessment of each of these subject areas.

Development of new species will require evaluation of their biological attributes, aquaculture potential, and specific cultural and regulatory impediments. Species development will require that each one of previously mention subject areas receive the required, but currently limited, research resources.



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ALTERNATIVE CROPS AND PRODUCTS

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Traditionally, agriculture has been viewed as a source only of food and fiber, although in fact agriculture is already a major supplier of fats and oils for many nonfood products. In the future, while agriculture's traditional mission will remain paramount, it could also become a much more significant source of industrial raw materials.

This new facet of agriculture can be based on the cultivation and use of alternative crops that most people have never heard of--guayule, kenaf, meadowfoam, cuphea, and others--and on the increasing development of nonfood products based on soybeans, corn, and many other familiar crops. For the research community, therefore, these new challenges will offer opportunities to expand the horizons of agriculture in the United States.

Why Alternative Crops and Products?

Surplus farm production, while not yet a thing of the past, no longer dominates agricultural policy. Last year's drought and forecasts of global production shortfalls showed that we need to maintain onfarm productive capacity. Future challenges will include the need to integrate alternative crops and increased production of traditional crops into our production system in environmentally and economically sound ways.

New and alternative crops have stimulated a great deal of interest for several very good reasons:

- * They can replace imports or can be exported as substitutes for raw materials and finished products.
- * They can, in some cases, replace nonrenewable resources, notably petroleum, for energy and chemical raw materials.
- * They can help provide needed jobs, often in rural communities. In Illinois and North Carolina, for example, small businesses that manufacture products based on super slurper, a highly absorbent material made from cornstarch,

have helped breathe new life into small town economies. Super slurper, by the way, was developed in the Agricultural Research Service Northern Regional Research Center in Peoria, Illinois.

- * They can help build sustainable agriculture by extending the farmer's range of options.
- * They can help protect the environment in many ways. For example, encapsulation of pesticides in cornstarch--a new use for an old product--promises to help farmers not only reduce the amount of pesticide used, but also improve the targeting of the pesticide. Another example: If programs such as biomass production for ethanol manufacturing get off the ground, we may find that we are recycling, rather than producing, carbon dioxide, a major cause of global warming.
- * And they can have strategic importance by providing domestic sources of raw materials for industrial products otherwise imported or based on imported materials.

A Tradition of Research

These are not new areas for investigation. The Agricultural Research Service conducts research on new crops using biotechnology, chemistry, and bioprocess engineering techniques. The resulting expansion of our knowledge base thus becomes an important resource for solving problems related to development of novel, high-value-added products.

ARS also has a long tradition of "utilization" research aimed at transforming conventional commodities--such as surplus cornstarch, soybean oil, and dairy materials--into novel products that are sought after by manufacturers of plastics, detergents, paint, lubricants, and cosmetics, among others.

Our philosophy is to bring this research to the brink of commercialization and then work with industry. Our responsibilities are enhancing germplasm, improving varieties, developing agronomic practices, and utilization. Our aim is to help capture markets for U.S. agricultural commodities through greater product diversification.

Support for Research

Never before, however, has the climate been so amenable to progress in this area:

- * The Technology Transfer Act of 1986 (Public Law 99-502) requires Federal Laboratories to work with industry toward the commercialization of new products. The new cooperative research and development agreements (CRADA's) arising from this law provide the cooperator with a first right to exclusive licenses on patented inventions made under the agreement. Then, ARS scientists work closely with companies to commercialize the technology arising from their research results. ARS has been one of the Federal leaders in this regard, having signed more technology transfer

agreements with industry than all but one other laboratory in the entire Federal Government.

- * Several commercialization bills have been introduced in Congress to encourage the development of alternative crops and new products, to foster economic development, and to improve the competitiveness of American farmers and processors. Most of these bills would significantly increase Federal support for the research.
- * Secretary Yeutter's continuing support of rural development activities will encourage assistance to entrepreneurs willing to risk developing new products. I might note that nearly half of the cooperative research and development agreements ARS has negotiated to date have been with small rural firms.
- * President Bush has clearly taken a stand in support of this kind of initiative, on environmental as well as economic grounds. He is on record, for example, for rebuilding the research effort on ethanol.
- * A four-state conference held in the Midwest last March involving agricultural interests in Iowa, Kansas, Nebraska, and Missouri signals strong support for alternative crops and products in the heartland. Another meeting, expanded to include other states, is being planned for next spring here in Washington, D.C.
- * And the first meeting of the Association for the Advancement of Industrial Crops, held last October in Peoria, broke new ground in proposing a variety of innovative uses for industrial crops.

Alternative Crops

Alternative crops are plants under agronomic development because they can be processed into products with existing or potential industrial demands. One reason for their importance is the need to reduce our national dependence on imported strategic and essential industrial materials.

USDA has screened thousands of wild plant species to find candidates for industrial materials production. ARS works with the Office of Critical Agricultural Materials of the Cooperative State Research Service to conduct and coordinate research and development of materials for industrial use. Several crop species have been chosen as candidates for commercial development, including kenaf, guayule, winter rapeseed, and crambe.

Kenaf is a fast-growing, fibrous plant that can be substituted for wood pulp in the manufacture of paper. Kenaf compares favorably with wood pulp for newsprint quality and cost. And since imports of newsprint are around \$4 billion annually, the potential economic impact is significant.

Encouraged by the American Newspaper Publishers Association, a cooperative agreement has been set up between USDA and industry to promote kenaf as an alternative fiber source for newsprint manufacture. Other uses for kenaf are being explored and appear to have potential. In support of these initiatives, ARS has re-instituted research on agronomic production of kenaf in Texas, Oklahoma, and Mississippi.

Guayule is a native plant of the Southwest that yields natural rubber. The Departments of Defense and Agriculture have an agreement for a joint Guayule Domestic Rubber Project. This project could provide a domestic source of natural rubber to satisfy 20 percent of DOD end-product needs. Research efforts are supplied by ARS and the state universities.

Rapeseed and crambe are members of the mustard family. Both yield erucic acid, which is an important component of specialty lubricants. USDA and various state universities are looking at the practicality of developing an industrial supply of erucic acid using domestically grown winter rapeseed and crambe.

Research efforts are underway on other new crops as well in ARS, university, and industry labs. Meadowfoam produces long-chain fatty acids suitable for cosmetics and lubricants. The Oregon Meadowfoam Growers' Association has promoted extensive plantings, and already a small amount of oil is being marketed to a cosmetics manufacturer.

Cuphea and Lesquerella produce seed oils that are good candidates for domestic production of lauric acid and hydroxy fatty acids, respectively. Imported coconut and palm kernel oils are currently our primary sources of lauric acid for manufacturing soaps, detergents, lubricants, and related products. Imported castor oil is our current source of hydroxy fatty acids, which are used in the production of plasticizers, coatings, lubricants, surfactants, and pharmaceuticals.

The major barrier to expanded production of these crops now may not be scientific but economic. Is the economic return sufficient to attract farmers to production of alternative crops? Can the new crops fit into existing rotations? Will new equipment be needed?

Alternative Products

A different approach is to produce non-food products based on traditional agricultural crops. In this area, ARS focuses on medium-volume products in the intermediate price range, such as specialty chemicals. We have found that agriculturally based products simply can't compete with the high-volume, low-priced products of the American petrochemicals industry. Likewise, we steer clear of the very high priced market end (biomedical products) because this would require only small quantities of major agricultural commodities--and therefore would have an insignificant impact on the agricultural economy.

Using both biological and chemical technology, we are building a resource base of technical know-how. The projects that have been undertaken could open up large new multi-billion-pound markets for cereal starch, soybean oil, and dairy materials (such as lactose and milk protein).

For example, the ARS research center at Peoria has developed technology for incorporating starch from corn or wheat into plastic films. This provides an agricultural mulch film that biodegrades. Other market possibilities include biodegradable trash can liners, grocery bags, and food packaging, as well as injection-molded articles such as beverage bottles. Substitutes for imported gums are being sought by altering starch structure biochemically to imitate gum-like characteristics.

Useful soybean oil products are already being made. For example:

- * Printer's ink now requires 300 million pounds of petroleum-based oil every year; a soybean oil substitute could use about 25 million bushels per year of soybeans produced in the United States. Already, soybean-based colored inks that don't rub off are a commercial reality. Research promises to extend this to the much larger black-ink market.
- * Biotechnology is being applied to produce hydroxy acids from soybean oil and replace imports of castor oil; current imports of castor oil are in the range of 100 million pounds per year.
- * Novel catalysts are being investigated for converting soybean oil to lauric acid, which is used in the manufacture of detergents and lubricants, with the view of reducing or replacing coconut and palm kernel oil imports.
- * And soybean oil is being developed as a fuel for farm tractors and to make cosmetics, specialty lubricants, and other higher value products.

Lactose from the dairy industry is being upgraded, through fermentation systems, to health-care products. Experiments in which milk proteins are cross-linked have led to the manufacture of thin, durable, and biodegradable films for packaging.

Impediments to Progress

All of these developments are encouraging, but we shouldn't let ourselves get carried away. If these things could be done easily, they would have been done long ago.

Research has made progress, is making progress, and will continue to make progress. We think the way to continue this progress is to link the research and development components as closely as possible. We might be able to speed up the process with additional support, but it would be unrealistic to expect an overnight turnaround.

In fact, research is out in front of the other factors needed for successful broad-scale industrial uses of agricultural products. For example:

- * The economics of developing products from the new industrial crops is almost a Catch-22 situation. Farmers aren't likely to produce a new crop without an assured market, and industry isn't likely to retool for processing an alternative crop without an assured supply. I can point to the Cooperative State Research Service's helping finance construction of a demonstration project for making newsprint out of kenaf pulp as an excellent example of public-private cooperation. Are there other, similar opportunities for leveraging industry's involvement?
- * Particularly in the developing stages of new technology, costs tend to be much higher for each unit of production than in more mature technologies. On their own merits, therefore, many new products cannot compete in the marketplace, at least initially. How can start-up costs be minimized?

- * Frequently, the total benefit to the overall economy is not figured into the equation. For example, calcium magnesium acetate (CMA) is an effective substitute for road salt, but its cost is considerably higher than that of salt. Yet how much does it save taxpayers in reduced repairs to roads and bridges? How much does it save car owners in reduced rust damage? How much does it benefit water quality and natural ecosystems that now receive salt-laden runoff?

Marketing Strategies

The classical approach to marketing is to look for a need, and then to fill it. Another approach is to develop a new product, and then to look for uses. Obviously, the first approach will be the one taken most often, but there will be room for the second approach at times.

The best-known example of a new technology developed first--and then new uses found--is the laser. More to our point today is another example: Super slurper, which was created in the ARS research center at Peoria and then languished on the shelf for years. This product was originally called "starch polyacrylonitrile graft copolymer," so there is little wonder that people weren't too excited about it. Then, an ARS employee coined the term "super slurper"--a highly descriptive, imaginative name for the product--and industry took a second look. The result has been the development of several innovative, useful products.

There is a great deal of support for continued research and development on alternative crops and products. The potential for commercial exploitation is there. The scientists are ready. Industry is guardedly optimistic. The time is right to move ahead.

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SUSTAINABLE AGRICULTURE

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Public fears regarding possible contamination of foods with agricultural chemicals has combined with persistent concerns for soil conservation and water quality to make agriculture and the environment a major national issue. Fears related to Alar in apples and cyanide in imported grapes, for example, replaced fears of another drought in summer 89 news headlines. The Food Market Institute reported that 82 percent of food shoppers responding to a recent survey said that chemical residues in foods posed a "serious hazard" to their health (Steimel).

Many farmers also are concerned about their own health and the health of others as evidence mounts concerning negative impacts of agricultural chemicals on the environment. Testing of farm wells used for drinking water have shown that a significant number contain at least trace levels of fertilizer and pesticide residues. A recent report by the Agriculture and Law Institute indicated that 40 to 56 percent of the 568 farmers surveyed favored restricting fertilizer application in watersheds known to have high risk of water contamination (Institute for Alternative Agriculture).

Even farmers who feel that current farming practices are environmentally sound are concerned about the future of a chemically dependent agriculture. Farmers realize that costs of pest control are rising as pesticides become less effective. Nearly 500 insects and 50 weeds have become resistant to pesticides over the past few decades (League of Women Voters). David Pimentel estimated that farmers have increased their use of pesticides more than 30-fold since 1945 while pest-related crop losses have continued to climb.

The National Research Council issued a landmark report, Alternative Agriculture, in 1989 that gave instant credibility to those who had contended previously that an environmentally sound and resource conserving agriculture could be productive and profitable as well. That report also identified agricultural policy and a biased research agenda at land grant universities as major obstacles to achieving a more sustainable U.S. agriculture. Agricultural impact on the environment has evolved into a major public issue.

The Question of Sustainability

Much of the current environmental debate in farm press has centered on the concept of Low Input Sustainable Agriculture or LISA. Research and education projects identified as LISA projects have been funded in the last three federal

budgets through the agricultural productivity title of the 1985 farm bill. Total funding for the 3 year period has amounted to less than \$13 million. However, the LISA program has been the focal point of much of the public debate regarding agriculture and the environment, even though LISA funds amount to less than 1 percent of the total federal agricultural research budget (Smith).

Low Input Sustainable Agriculture (LISA) is a relatively new term and thus has no universally accepted definition. However, LISA actually embodies two separate concepts: low input (LI) and sustainable agriculture (SA). These two terms are related but do not mean the same thing.

Sustainable Agriculture. A definition of sustainable agriculture is still evolving as a product of debate concerning agriculture and the environment. However, there seems to be a growing consensus that a sustainable agriculture must be made up of farming systems that are capable of maintaining their productivity and usefulness to society indefinitely. Sustainable systems must be resource conserving, socially supportive and commercially competitive as well as environmental sound (Ikerd).

Systems which fail to conserve their resource base eventually will lose their ability to produce. Thus, they are not sustainable. Systems which fail to protect their environment eventually do more harm than good, ultimately destroy their reason for existence and thus are not sustainable. Resource conservation and environmental protection are the ecological dimensions of sustainability.

Farming systems which fail to provide adequate supplies of safe and healthful food at reasonable costs will not support social progress and ultimately will lead to political disruption. Agricultural systems of communist Europe and China are prime examples of systems that were not politically sustainable. Systems that are not commercially competitive will not generate the profits necessary for financial survival of producers and thus are not sustainable. Social supportiveness and commercial competitiveness are the socioeconomic or economic dimensions of sustainability.

In the long run, there is no conflict between ecologic sustainability and economic sustainability. In the long run, farming systems must be productive, competitive and profitable or they cannot be sustained economically. Also, systems must be ecologically sustainable or they cannot be profitable in the long run. Even in the short run, there is no conflict between ecology and economics from the standpoint of society as a whole. When all costs and benefits to society over time are considered social costs will exceed social benefits only for those systems that are also ecologically sustainable.

The potential conflict concerning sustainability arises between individual producers and society in the short run. In the short run, systems that are most profitable for individual farmers may or may not be sustainable. Also, sustainable individual farming systems may not be profitable in the short run.

In such cases agricultural sustainability may require government

involvement. Government subsidies and penalties can be used to reconcile differences between private and social costs and benefits so farmers will find it in their self interest to make decisions that also are in the interest of society in general. Alternatively, government funded research and extension programs can facilitate development and adoption of farming systems that are both ecologically sound and economically viable.

Are current agricultural systems in the U.S. is sustainable? This is the crux of the sustainability issue. Many farmers, commodity groups and agribusiness firms argue that there is no evidence that our current system is not sustainable. They contend that U.S. consumers have the most abundant, healthful and safe food supply in the world and that people are leading longer, healthier lives as a result of modern agriculture.

Environmentalists, on the other hand, argue that the evidence of environmental degradation, such as chemical residues in water supplies, is conclusive and it clearly indicates excessive use of synthetic chemical in farming. Consumer advocates argue that we can't wait for future cancer and other health consequences of consuming chemically contaminated foods before we restrict their use.

Conservationists, point to the non-renewable nature of soil, fossil fuels and many water sources as clear justification for social constraints in resource use. These groups contend that delays in addressing the issue of the negative ecological impacts of conventional farming can only add to growing, possibly irreversible, risks to people and damage to our environment.

The current public debate is between those who would continue to emphasize productivity and profitability as a means toward the end of sustainability and those who feel that agricultural sustainability is threatened by current farming practices which waste scarce resources, degrade the environment and present unacceptable risks to consumers. Neither group is opposed to the objective of sustainability. They differ only with respect to the means of achieving sustainability.

Low-Input Versus Sustainable. The low input or LI part of LISA generally is associated with farming systems which rely less on external purchased inputs, such as chemical fertilizers and pesticides, and more on internal resources such as land, operator labor and management (Rodale). There is no clear division or point of separation between low input and high input farming systems. Thus, lower input rather than low input might be a more appropriate term. Systems become lower input if they reduce their reliance on external inputs and increase reliance on internal resources. Higher input systems, on the other hand, rely more on external inputs and less on internal resources.

Lower input systems may or may not be more sustainable than higher input, conventional farming systems. Lower input systems tend to be more resource conserving and environmentally sound than conventional systems. For example, lower input systems that use less synthetic chemical pesticides typically represent lower environmental risks than do higher input, chemical intensive systems.

However, major reservations and questions have been raised regarding the productivity or ability of lower input systems to support growing populations with safe, healthful, food supplies at reasonable prices and on their profitability and competitiveness with higher input systems (Ruttan).

Lower inputs is not an end but rather is a means to an end (Shaller). Reducing reliance on external inputs is one means or strategy for achieving the end or objective of greater sustainability. However, reducing inputs may or may not be an effective means of achieving sustainability. Economic viability and ecological soundness are both necessary, but neither alone is sufficient, in ensuring long run sustainability.

Sustainability Requires Survival

Sustainable farming systems must be able to survive adversity. The Rodale Institute talks about five Rs of sustainable systems: resistance, resilience, regeneration, re-design and replenishment (Heart). Shocks and associated threats to survival are an inescapable aspect of the ecology and economics of agriculture. Sustainable systems may resist, absorb, recover, adjust or be restored, but somehow they must be able to persist under conditions of periodic ecologic and economic adversity.

A sustainable farming system must be able to survive drought, floods, pest outbreaks and other physical shocks to the ecological system. It also must be able to survive short run economic losses due to periodic crop failures, depressed markets and rising input costs that characterize the agricultural sectors of most economies. Sustainable systems may be unprofitable at times, possibly even for extended periods of time, but they must be able to resist or recover from adversity.

Farming systems that are productive and profitable under favorable weather and market conditions may be highly vulnerable to adverse physical or economic shocks to the system. Systems that appear to be sustainable even under average conditions may not be able to survive during adversity. Such systems may not be sustainable in the long run even though under average conditions they could be productive and profitable.

The Issue of Sustainability

The pursuit of competitiveness and profitability has driven U.S. farmers to greater reliance on external inputs. Competitive pressures have forced farmers toward greater specialization as a means to greater efficiency. Synthetic chemical fertilizers and pesticides have allowed farmers to abandon crop rotations and mixed livestock, cropping systems in favor of more specialized cropping and specialized livestock systems. Low energy prices also allowed economic use of larger, more specialized equipment and production facilities which encouraged greater specialization.

Increased specialization has allowed farmers to realize economies of scale in production, marketing and financing in their operations. Specialization has

resulted in increased efficiency of farm operators' labor and management resources. However, specialization has meant greater reliance on synthetic fertilizers, herbicides, insecticides and other external inputs.

The trend toward greater reliance on external inputs has not been limited to commercial fertilizers and synthetic chemical pesticides or non-renewable energy based inputs. Specialization also has meant greater reliance on borrowed capital and hired labor, and on more specialized knowledge and management skills in the form of paid consultants.

Rising Costs of Specialized Systems. Efficiency gains from specialization have been generally recognized and widely accepted for centuries as an economic fact of life. However, the reliance of specialized farming on greater use of external inputs has raised significant economic as well as ecologic questions. First, there are growing indications of declining effectiveness of the technologies which support specialized systems.

Specialized production has increased insect pressures in areas where large acreage of one or two crops have replaced more diversified cropping systems. In addition, insects are becoming resistant to insecticides and require higher rates of application or new insecticides for control. New insects sometimes replace the old. Beneficial insects often are destroyed along with the pests requiring even greater reliance on insecticides at higher costs. The same types of problems are appearing for herbicides as new, more resistant weeds appear after others are brought under control. In addition, herbicide carry over and build up in some soils can cause problems with following crops.

Previously fertile soils in some areas have lost organic matter and natural fertility through monocropping, conventional tillage and removal of crop aftermath year after year. Lower organic matter has meant less ability to hold water and nutrients in root zones meaning lower yields from a given level of water and fertilization or higher fertilizer and irrigation costs to maintain yields.

Other cost of increasing specialization are beginning to show up in the environment of farm families and farm workers. Health risks in handling pesticides, for example, have become a major issue in farm safety. These risks eventually translate into less effective pest control, higher labor costs or greater health risks for family members.

Chemical contamination of farm water supplies is another emerging concern of farm families. Nitrate problems in groundwater may be attributed as much or more to livestock waste and crop residues as to use of commercial fertilizer. However, this issue, as much as any other, has increased the awareness of farmers to the potential environmental hazards of chemically dependent farming.

Until recently, the environmental costs of increased use of commercial fertilizers and synthetic pesticides were external to the farm or imposed on society in general. The health risks to farm workers and farm families are internal costs and thus command the immediate attention of farmers.

In short, current trends in fertilizer and pesticide use seem to point to an increasing cost of supporting specialized farming systems. Research is currently underway to validate or refute this hypothesis and, if valid, to evaluate its significance.

The Question of Resource Risks. Farmers who rely on external inputs and specialized farming systems for their economic well being are similar in many respects to countries, regions and communities that rely on specialization and trade for their economic well being. They gain from greater economic efficiency by realizing their competitive advantages. However, reliance on external inputs embodies risks -- risk that currently profitable markets will be lost and risk that inputs will no longer be available at reasonable costs from external sources.

Perhaps the most graphic recent example of this type of risks was the reliance on U.S. crop producers on export markets for wheat, corn and soybeans during the 1970s. Many farmers borrowed large sums of money to buy additional land and buy specialized equipment to supply these potentially profitable markets.

Specialized farmers producing export dominated commodities were hardest hit by the financial crisis of American agriculture in the early 1980s. They had taken the risks associated with dependence on external inputs, including borrowed capital, labor saving equipment, commercial fertilizers and synthetic pesticides to produce for markets that were vulnerable to an unpredictable world economy.

Comparative advantage is concept commonly used by economists to illustrate potential gains from specialization and trade (Ikerd, et. al). The principles of comparative advantage show that maximum output can be achieved at minimum cost for a farm, a country or the World if all producers specialize in producing things they can produce most efficiently relative to other producers.

However, few countries are willing to depend totally on any other country for their survival. Countries sacrifice potential gains from specialization and free trade to maintain some minimum level of economic security. Few regions, states or communities within countries seem comfortable with employment bases that are reliant on markets or input suppliers in places beyond their economic control or influence.

Countries, regions and communities recognize the necessity to specialize in order to realize their comparative advantages. The costs of self sufficiency are too high. However, they also are willing to sacrifice some level of economic gain from specialization to maintain a degree of economic security.

The costs of self sufficiency in farming also are too high. Farmers will continue to specialize to some extent and will use some external inputs. However, highly specialized systems are risky. They may not be resistant, resilient or regenerative and thus may not be sustainable over time.

In summary, farm policy may be required in some cases to make more

ecologically sustainable farming systems economically sustainable as well. In some cases, research and extension of new technology may be required to develop farming systems that are both ecologically sound and economically viable.

However, there is a general tendency for economic and cultural trends that are logical at one point to progress beyond the point of logical adoption at a later point in time. This tendency is responsible for business cycles, commodity price cycles and cyclical social phenomena.

The trend toward input intensive, specialized farming systems may have gone beyond its logical point of progression. If so, many farmers may have an economic as well as ecological incentive to move toward more sustainable farming systems even with existing technology and existing farm policies.

Sustainable Strategies for Agriculture.

The philosophical foundation of sustainability is found within the concept of agroecology. Agroecology is a synthesis of agriculture and ecology (Altieri). The fundamental purpose of agriculture is to enhance the productivity of nature in ways that favor man relative to other species. However, for agriculture to be sustainable, it must be compatible with its physical and social environment.

Man is seen as only one component of an essentially interrelated ecosystem. The ecosystem includes other people and societies as well as physical resources such as soil, water and air. Attempts to shift the balance too far in favor of man over other species, or in favor of some people relative to others, or in favor of one generation relative to others may destroy the critical ecological balance and eventually destroy mankind.

Ultimately, sustainable agricultural systems must reflect the inherent interrelationships among man and the other elements of his physical and socioeconomic environment. Thus, the objective of agroecology is to enhance nature rather than replace nature, to work with nature rather than conquer nature.

There are three basic strategies for developing more sustainable farming systems. The first is to increase input efficiency within specialized systems, the second is to develop more efficient diversified farming systems and the third is to develop profitable markets for commodities that can be produced with fewer external inputs.

Increased Input Efficiency. Current environmental risks may be more a result of misuse than of use of external inputs. Some environmentalists contend that any use of synthetic chemicals in any amount in farming represents an unacceptable risk to the environment. However, the general public is much more concerned about measurable chemical residues in food and water supplies than about the fact that synthetic chemicals are used at all.

Some ecologists contend that specialized monoculture systems of farming are inherently unsustainable (Altieri). In a long run, philosophical sense this contention may be valid. However, the greatest current threat to sustainability

seems to stem from conventional production practices which support specialized farming systems rather than from specialization per se.

Regardless of their longer run sustainability, current environmental and resource risks could be reduced through more efficient use of inputs in specialized farming systems. In fact, greater input efficiency in larger specialized operations quite likely represents the greatest potential for reducing environmental risk from farming over the next decade.

Increased input efficiency is possible with existing technologies. Application rates, timing and placement of fertilizer is one area for potential improvement in efficiency and sustainability. For example, nitrogen applied in the right amount at the right time at the right place will be used by the plant and will not contaminate water supplies. Wasted nitrogen contributes cost but no returns to the economics of crop production. Thus, more efficient nitrogen application through soil testing, tissue testing, banding and split applications could increase the ecologic and economic sustainability of crop production systems.

Similar possibilities for greater sustainability exists for use of insecticides, herbicides and other pesticides even in specialized farming operations. Pesticides applied at the right time and right place may control pests more effectively at lower rates of application. More effective pest control at lower levels of use reduces environmental risks and increases economic sustainability.

Resource conservation also may be achieved through more efficient resource management. For example, efficient irrigation scheduling may reduce crop stress while cutting use of water and energy. More predictable growth may allow more effective use of fertilizer and other inputs as well. Reduced tillage can reduce soil loss and cut energy inputs without sacrificing profitability in many situations.

Some intensively managed systems may use more rather than fewer external inputs. Some reduced tillage systems may require greater use of pesticides, at least in the short run. However, greater input efficiency means fewer inputs per unit of output and less potential negative spill over of inputs into the environment. Thus, net gains in sustainability may be possible through greater input efficiency without changing basic cropping systems.

Diversified Farming Systems. The greatest long run promise for sustainability seems to lie with a return to more diversified systems of farming. Diversified systems are generally conceded to be more ecologically sound than specialized systems. However, questions have been raised regarding the economics of diversification. Diversified systems of the past were abandoned for specialization on many farms.

Gains from specialization are undeniable but are not the only route to greater economic efficiency. There are potential gains also from integration. The productivity of an integrated system can be greater than the sum of the products of the individual system components. This phenomenon is called

synergism (McNaughton). Specialized systems sacrifice the potential gains from synergistic interaction among the various components that are possible with diversified systems.

An obvious example of synergism is the interaction between livestock and crop rotations which include high quality legume forage crops. Livestock add value to the forage and recycle nutrients back to the soil in the form of manure. Legumes add nitrogen to the soil, break row crop pest cycles and provide feed for the livestock.

Livestock without high quality legume pastures may not be profitable. Legumes in rotations without livestock may not be profitable. However, integrated livestock, legume rotation systems may add profitability to the total farming operation. This is but one example of the potential synergistic gains from integrated farming systems.

Risk is another important, but often overlooked, consideration in diversification. Risks may be far greater in a specialized farming operation than in a diversified farming system with the same basic level of uncertainty in each system component.

For example, assume that one farmer has four enterprises and that each has an equal chance of returning a positive \$6,000 or negative \$2,000 net return in any given year. His average return is \$2,000 per enterprise or \$8,000 in total. If they all are positive he will make \$24,000 and if they all are negative he will lose \$8,000. But, let's assume that the enterprises are totally uncorrelated. Net returns from each enterprise move up or down independently of each other.

Now let's assume that another farmer specializes in one of the four enterprises but produces four times as much of it as our first farmer. The second farmer has the same chance of making \$24,000 or losing \$8,000 in any given year as the first has of making \$6,000 or losing \$2,000 on that one particular enterprise because the second farmer produces four times as much of it.

Both farmers have the same long run average or expected net return, \$8,000. However, the diversified farmer is far more certain of a positive return than is the specialized farmer. In fact, the variability of his net returns from year to year will be only about one-half as great for the diversified farmer as for the specialized farmer in this case.

Risk reducing effects of diversification are even greater if enterprise returns are negatively correlated, but will be less if they are positively correlated. Statistically calculated variance relationships between specialized and diversified operations vary from case to case. However, the general relationship will hold: diversified systems yield more stable returns over time than do specialized systems. This is the foundation for the old saying: "Don't put all your eggs in one basket."

In summary, synergistic farming systems are made up of system components which complement, coordinate, correlate, conserve and contribute. Such

components complement by completing nutrient and water cycles to increase efficiency and reduce wastes. Such systems use land and labor efficiently through coordination of activities to keep all resources fully employed without overextending any. Low or negative correlations among farm system components ensures offsetting production and price risk characteristics which enhance stability and reduce financial risks.

In addition, diversified synergistic diversified systems conserve their resource base by combining components which address the multiple environmental and economic objectives of sustainability rather than exploitation of resources for unsustainable short run profits.

Markets for Low Input Commodities. The third strategy for greater sustainability is to find profitable markets for commodities that can be produced with fewer external inputs. The organic food market is an example of one such market. Organic farmers have been important advocates of more research and information related to agricultural sustainability. Consequently, the whole concept of lower input sustainable agriculture frequently has been identified with organic farming. In reality, organic farming is only one example of one strategy for agricultural sustainability.

The significance of the organic food example is related as much to organic markets as to organic production methods. Few farmers can afford to adhere strictly to organic standards of food production unless they receive a premium for the commodities they produce organically.

Many farmers may be able to reduce chemical fertilizers and pesticides significantly without sacrificing profitability. However, total elimination of synthetic, chemical inputs typically will result in higher costs of producing commodities for conventional markets. Organic farmers may choose their farming systems for ecological reasons, but the market premium for organic foods provides the necessary economic sustainability for many.

The organic food market is not the only potential market for commodities that can be produced with fewer external inputs. Several attempts have been made to gain consumer acceptance for beef finished on forage rather than grain. Such beef could be produced on diversified livestock-crop farms with increased use of forages in crop rotations. Diversified forage finished beef farms might well be more sustainable than row crop farms or cattle feed lots. However, the key is to success in market acceptance.

A fundamental market oriented strategy for sustainability is to avoid head-to-head competition with large, specialized operations that produce basic, undifferentiated commodities for price competitive markets. Success with this strategy hinges of finding something for which consumer preference is based more on a subjective quality such as healthfulness rather than price, something that is not readily adaptable to large, specialized farming operations, and something that can be readily identified with ecologically sound system of farming.

New markets may not provide sustainable farming opportunities for a large proportion of U.S. farmers over the next decade. However, such markets may be

a means of survival for some who otherwise could not compete. More important, such systems could provide insights into the types of food-farming systems that will ultimately be required for true long run sustainability.

Toward Better Farming Systems

Sustainable farming is neither a matter of minimizing inputs nor of maximizing profits. Neither of these approaches may result in a sustainable system of farming. Sustainability cannot be achieved through a predefined set of management practices or a recipe for success. The optimum balance between ecology and economics must be derived region by region, farm by farm, crop by crop and field by field.

Competitiveness and profitability of various systems can be changed through public policies which regulate, penalize and reward farmers for various conservation and environmental practices. However, changes in farmers' management decisions may affect sustainability more than changes in farm policies.

Farmers always have been willing to try to farm better. At different times the term better has referred to conservation, to production and to profits. Now, many are saying that better farming means more environmentally sound. But, systems that minimizing environment impacts may be no more sustainable than those that maximize production or profits.

Better farming means balanced farming. Better farming means balancing ecologic, social and economic considerations for short run survival and long run sustainability. Most farmers can farm better than they are farming now. But, better farming will require more research and information that is relevant to a balanced approach to farming. Better farming will require integration of ecology and economics into a workable, farm-level system for sustainability.

Regulations, penalties and subsidies may be required to achieve sustainability in some cases. However, public policies that support research and information may be more important than regulatory policies in the long run. Funding of LISA research and education programs over the past two years has been a step in the right direction. However, the move toward better farming has barely begun.

"People are more likely to change their behavior if they believe they can change, are shown specific examples of what to do and are given a chance to practice their new skills so they build confidence in their ability. People need much more than a lecture." (Bandura) This should be a guiding principle in public policies which support of agricultural sustainability.

Farmers need believable, research based information on workable, balanced systems of farming. They need to see these systems working on research stations and on their neighbors' farms. Farmers need decision support systems that will allow them to organize, evaluate, integrate, and synthesize information and observation into systems that are sustainable on their own farms. They need much more than a lecture.

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MANAGEMENT DECISIONS FOR ALTERNATIVE AGRICULTURE

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Several definitions of "alternative agriculture" are presently in use. In a recent report on farming alternatives in New York state, Miller et al. identified three definitions as follows:

The alternative label has connoted a broader context than [farm] diversification, implying not only examination of nontraditional crops but also experimentation with new or alternative types and systems of agriculture ranging from organic production techniques to more intense production and marketing procedures (Estest and Ingram).

"Alternative" . . . [is] defined as any agriculturally based activity not traditionally considered as a predominant activity. It is important to distinguish "alternative" in this sense from alternative farming systems (organic, natural, etc.) although they certainly may be a limited subset of the alternative opportunities available (Goodwin).

We use the term alternative agriculture to refer to adoption of production methods designed to use fewer purchased inputs, selection of unconventional farm enterprises, and diversification of enterprises and uses of family resources, including combining agricultural and nonagricultural enterprises under the same ownership or management (Babb and Long).

A common element among these definitions is that alternative agriculture can involve unconventional production methods such as use of fewer purchased inputs and it is management decisions associated with this aspect of alternative agriculture that I will focus on today.

For example, there seems to be particular interest currently in production practices which involve decreased use of agricultural chemicals. This interest among researchers, consumers, program leaders, policymakers, and farmers is not new but may be more prevalent now than perhaps ever before. My perception is that much of the non-farmer interest in unconventional production practices is a result of environmental and food safety concerns. Farmer interest may be based on similar concerns in addition to perceived economic incentives.

The motive underlying interest in unconventional production practices is important because unconventional can mean so many different things -- some of which involve "business as usual" in a management decision-making sense and some of which do not. It is my feeling that some of the most publicized, scientifically interesting, and promising directions of alternative agriculture such as low input agriculture are also cases which may be most likely to benefit from an alternative approach to management decision-making.

Today, I will first review production management decision-making and particularly Cooperative Extension's contribution to production management information and education. Second, I will discuss the appropriateness of common management decision-making tools for a class of unconventional production practices. Finally, I will be so bold as to suggest a direction for support of management decision-making in alternative agriculture that might provide a reasonable course for Extension and researchers to pursue in the years ahead.

Decision-making in Conventional Production

Management decisions in agricultural production can be and often are based on various methods including intuition, randomization, analysis, habit, and combinations of these methods. Different decision-making methods can require different kinds and amounts of management information. For example, management based on habit may require relatively less information for decision than the other methods while the relative information requirements of the remaining decision techniques is less apparent.

Cooperative Extension, universities through classroom training and, in some instances, state departments of agriculture have been important proponents of analytical decision-making in agriculture; that is, they have been advocates of management decisions based on systematic evaluation of agricultural production choices to determine the best choice with respect to an objective. Management decisions based on individual farm-level analysis are typically advantageous in that the likelihood of a favorable outcome for the decision-maker is greater than that of other choice techniques. Not only has Extension provided extensive technical information on various production practices but has also provided information and education specifically for application of analysis to production management decisions. For example, enterprise specific cost and return data have been developed and dissemi-

nated to farmers by Extension for many agricultural enterprises. Instruction in recordkeeping methods and information processing techniques such as budgeting, break-even analysis, and marginal analysis has also been available to farm managers through Extension. In addition, detailed applications of basic analytical methods have been designed to assist in specific management decisions such as those, to provide a recent example, that are related to multiple peril crop insurance.

Particularly during recent years, analysis of farm production decisions utilizing computer methods has been encouraged by Extension. Computerized spreadsheet programs and other more specialized computer software have been incorporated in Extension's efforts to popularize analytical decision techniques in agriculture. The contribution of Extension to efficient management decisions in agriculture has been an important one. Information for production management decisions associated with conventional production practices is available and efforts to improve it are constant. Though the ultimate goal of fine-tuned analytical decision-making in agriculture may never be fully achieved, Extension's efforts to better facilitate analysis of production choices by farm-level decision-makers can be expected to continue to improve and particularly to improve as the availability and acceptability of computer technology on farms becomes more widespread.

In a nutshell, agricultural researchers and Extension have developed an information/education base and delivery system which provides an analytical capability for many farm-level management decisions associated with conventional agricultural production. Few may be entirely satisfied, as is always the case, with the information base and the efficiency of management decision techniques which result. Even so, much progress has been made and more is expected, the record of success is evident, and any existing departures from efficient management decisions brought about by limitations in Extension management education should not be allowed to detract significantly from the record of accomplishment.

Decision-making in Unconventional Production

As mentioned previously, an unconventional production practice can refer to many different things ranging from a simple, though perhaps very important, discrete change in production method to a fundamental revision of production practice. For example, halting irrigation in mid-August for cotton production in California's Imperial Valley is an unconventional production practice which may have important consequences for successful pest management in that region. However, it is important to note that implementation of such a practice does not significantly add to the burden associated with production management decisions. Implementation of a pest management strategy designed to minimize or eliminate use of pesticides generally, on the other hand, may require addition of numerous carefully timed production decisions in conjunction with extensive environmental monitoring and, if pursued vigorously, may increase the level of complexity of management decisions by an order of magnitude.

Today, I am focusing attention on management decisions for unconventional production practices which are of the latter type; that is, practices which may necessitate extensive changes in production technique and which thereby introduce additional management complexity. My reasons for focusing on these cases are (1) existing management information/education program developments of Extension probably provide relatively adequate analytical decision support for unconventional production practices which avoid fundamental alterations in technique and (2) much of the interest I perceive in alternative agricultural production is in implementation of unconventional production practices which may significantly add to the burden of production management decisions; that is, practices which will exchange potentially undesirable aspects of conventional production methods along what may be a steeply ascending trade-off curve with respect to management decision complexity.

Our experience with integrated pest management (IPM) provides an example of an unconventional production practice that illustrates both the trade-offs that may be involved in exchanging management complexity to achieve an objective and approaches for coping with these trade-offs. Pesticides introduced after the second world war were integrated into agricultural production as other post-war "modern conveniences" were integrated into everyday living. Disintegration of pesticides and agricultural production, on the other hand, is apparently much more difficult to accomplish because convenience and/or productivity may appear to be at stake. In some cases, lowered expectations and/or increased riskiness of outcomes may occur. Even when risk-reward trade-offs for properly implemented IPM technologies are comparable to conventional practice, convenience from a management standpoint may be lacking. Habits must be replaced with choices and the choices must often be made well in order to maintain the level of productivity to which we have become accustomed.

IPM decision strategies can involve very detailed monitoring and decision procedures which must often be implemented as a whole in order for the procedures to be effective relative to conventional pest control practice. The obstacle presented by management decision complexity may be a serious one for IPM adoption even when the properly implemented technology is known to be effective. Experimental demonstrations that a particular IPM strategy when properly implemented is as effective as a conventional one or a number of so-called farm success cases with respect to application of a technology may only shed light on a portion of a decision-maker's concerns. Obviously, the innate riskiness of a production practice interacting with transitory elements of an ecosystem is an important management consideration; however, the number and complexity of management decisions required to implement the strategy may also be important if there is risk of mistaken decisions which can affect outcomes. It may be the case that managers have many production and marketing concerns and may find sacrificing very convenient production management strategies acceptable only when the alternative is known to be substantially superior to conventional production practices from an economic perspective and when the perceived sensitivity of outcome to management error is small.

And how has the traditional emphasis of Extension management information/education fit into IPM decision-making? Few question the desirability of Extension's emphasis on the need for the management function and record-keeping, the basic economic principles of decision-making such as marginal analysis, analytical tools such as budgeting for diagnosing problems and planning, and the focus on the rudiments of choice under uncertainty and risk in agricultural management decisions. However, the impact of this emphasis in terms of IPM decision-making has not been entirely clear.

The increased number of decisions and complexity of decisions that can be affiliated with an IPM strategy has not seemed to lend itself to individual analytical management decisions at the farm-level. Extension IPM has focused on providing pre-packaged management strategies to the farm-level rather than emphasizing the virtues of individual farm-level analysis based on management education. One possible explanation is that which Hall notes in a recent article on IPM decision-making. He observes that "it is difficult enough for Ph.D. agricultural economists and entomologists to develop these (analyses) . . . much less expect that each farmer will do so."

Extension Support of Management Decision-making for Alternative Agriculture

From a purely conceptual standpoint, all production management decisions based on analysis can involve substantial complexity. However, from a practical point of view, impressive productivity levels have been achieved with conventional production practices while maintaining a tolerably difficult analytical basis for farm-level management decisions. Purchased agricultural inputs, in particular, may contribute substantially to the robustness of conventional production practices with respect to the amount of detail that must be incorporated in management decisions. For example, chemical pesticides provide for rapid adjustment to pest problems when the need arises and this flexibility may permit numerous pest management mistakes with little cost.

Unconventional production practices, and especially those involving reduced or eliminated agricultural chemical use, may in some instances provide for less tolerance of a lack in management precision with regard to outcomes. An unconventional production practice developed to function in concert with an ecosystem may be capable of providing for impressive productivity when implemented with precision. However, the extent to which productivity is tied to the level of detail involved in production management decisions may be less clear but may also be a crucial aspect with respect to widespread adoption and successful implementation of the practice.

For the case of unconventional agricultural practices which require an increase in both the number and complexity of management decisions, the vulnerability of the practice to management error is important information with respect to Extension programming in management. If an unconventional practice is as forgiving regarding management decision-making as conventional practice, then the traditional Extension information/education

dichotomy may provide for adequate farm-level analysis of management decisions. If, on the other hand, the outcome of an unconventional production practice is found to be highly sensitive to precision in management decisions, then Extension may best serve its clients through an alternative management approach. In this regard, the approach of Extension IPM may provide a useful direction. Investment in research to develop specific pre-packaged management strategies associated with an unconventional practice may provide useful Extension information products and facilitate successful transition to unconventional practices.

Summary

- Unconventional production practices can involve an increased number of production management decisions relative to conventional practices and therefore can increase the risk of management error.
- Extension's traditional approach to management information/education may not provide sufficient analytical capability to the farm-level to support management decision-making for unconventional production practices for cases where these practices are very sensitive to the quality of management decisions.
- Preparation of sophisticated research and Extension pre-packaged management strategies for unconventional production practices may be a better approach for supporting decision-making in alternative agriculture.

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THE 1990 OUTLOOK FOR FOOD PRICES

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The rise in retail food prices in 1989 has been higher than in recent years. When data are available for all of 1989, the Consumer Price Index (CPI) for food is expected to average about 6 percent above last year. This will be the largest increase since 1981. Prices of food purchased in grocery stores will average slightly more than 6 percent above 1988 while food sold in restaurants and fast food establishments will average just under 5 percent. Food prices in 1989 have added to the general inflation rate since the CPI for all items has risen at a slower rate of about 5 percent.

Farm prices, costs for processing and distributing foods, and consumer demand are the major factors influencing food prices. All of these factors have played a role in pushing food prices higher this year. Tighter supplies of some food commodities, which resulted partly from the 1988 drought and partly from weather disruptions in the first half of 1989, pushed the farm value of food up about 7 percent. A similar increase in the cost of processing and distributing foods reflects higher costs for energy, packaging, transportation and labor. Consumer demand has been bolstered by increased real disposable personal income at a rate of near 3 percent for the last two years.

In 1990, food prices are expected to rise 3 to 5 percent, a slower pace than this year. Supplies of most foods will be ample next year. Some foods, however, will require another growing season for supplies to fully recover from the 1988 drought. Farm prices will be relatively stable compared to 1989. The general inflation rate is also expected to slow in 1990, helping to reduce rises in the costs of processing and distributing foods. A discussion of the major CPI food categories will help to explain the current food price situation which sets the stage for our 1990 outlook.

Red meats

Per capita red meat consumption estimates for 1989 are 2 percent below 1988. The decrease reflects smaller beef production with

pork production averaging about the same as in 1988. Retail prices for beef, however, have been significantly higher, averaging about 6.5 percent higher in 1989 than in 1988. Increased real disposable personal income has helped to strengthen demand for beef along with smaller supplies are partly responsible for the price increase. Other factors which could strengthen demand might also be examined.

Considering the record large supplies of total red meat and poultry over the last several years, beef price increases have been larger than might be expected. Analysts speculate that a combination of factors could be supporting stronger demand for beef. First, beef has undergone product changes to enhance its image over the last few years. The most obvious changes are the closer fat trim along with more boneless cuts. These changes have increased the value of the product and consumers are willing to pay higher prices for the added value. Next, promotion of the leaner beef has helped to improve the image of beef as a healthy food and reduced the fear of cholesterol. Consumers are hearing more and more that red meats are an important source of some essential nutrients and, when served in moderate portions with a proper blend of other foods, contributes significantly to a well balanced diet. These factors would have a positive impact on demand for beef and could help explain the sustained higher retail prices for beef over the past few years.

In 1990, beef and pork production will be slightly higher than in 1989. Because of higher exports, however, domestic beef supplies will be slightly lower than this year. Domestic pork supplies will be up enough to keep total red meat consumption about the same as this year. Retail prices for red meats will average 1 to 3 percent higher in 1990 than in 1989.

Poultry

Poultry production has been rising at a 4 or 5 percent rate for several years. Per capita consumption of poultry has increased about 14 pounds since 1985. It is increased poultry supplies that have given us record large total meat supplies last year, this year, and likely next year too. While production has been increasing, particularly for broilers, so have prices. The CPI for all poultry this year is expected to average 7 percent above last year.

Higher prices for chicken in grocery stores has stemmed from strong competition for supplies by fast food chains. Fast food firms have been expanding their menus, using new chicken items to add variety. Promotion for chicken items has been used extensively in this fiercely competitive market and consumer acceptance has been strong. When a firm has committed to a promotion program it must be sure the product will be available, therefore, chicken supplies are contracted for well in advance. Demand by the promoting fast food firm becomes quite inelastic,

and prices are often bid significantly higher. These are the market conditions grocery stores have had to cope with for the past several summers and has been a major factor in higher retail prices. The price spiral may have ended, however, since prices have been declining in the second half of 1989.

Declines in retail poultry prices are expected to continue in 1990. Broiler production is expected to expand again next year by about 7 percent. Larger supplies of poultry will dampen producer prices, however, producer profits are expected to remain positive, encouraging increased production. As a result, retail prices in 1990 will average well below 1989 prices.

Eggs

Retail prices for eggs in 1989 will average more than 18 percent above 1988. Table egg production in 1989 is down 4 percent. Egg producer's profits have been limited for several years and when feed prices increased following the 1988 drought, production was cut. Lower production along with increased export demand has caused the sharp increase in domestic retail egg prices.

Contrary to the long term downward consumption trend, per capita egg consumption next year will remain about the same as in 1989, perhaps even up slightly. The discovery that eggs have less cholesterol than previously thought will have a positive influence on demand. Even so, retail prices for eggs will average well below 1989 as production increases in the second half of 1990.

Dairy products

Retail prices of dairy products have remained relatively stable for the past several years, rising at a 2 to 3 percent rate. This year, the CPI for dairy products will increase at a rate nearly twice that of the past two years. Much of the 1989 price increase will be noticed in the fourth quarter.

Much of the price increase can be attributed to production declines caused by poor forage (feed) quality, a carry over from the 1988 drought. Increased demand for cheese at a time when stocks were low, and strong export demand for nonfat dry milk boosted prices, signaling for increased production. The drop in milk production, however, meant milk supplies for manufacturing were limited, and fluid milk prices rose also. As a result the CPI for dairy products in 1989 will average about 6 percent above 1988.

The forage situation has improved and milk production will likely increase in 1990. Improved milk production will ease price pressure on both manufactured and fluid milk products. The CPI for dairy products in 1990 is expected to remain nearly level

with the 1989 average.

Cereals and bakery products

The CPI for cereals and bakery products has risen sharply in 1989, about 8.5 percent above 1988. The strongest increase has been for breakfast cereals. Growing consumer demand for high fiber and other nutritional benefits in breakfast cereal has manufacturers scrambling to meet the consumer requirements. A quick glance at the cereal shelves in the grocery stores will reveal a plethora of new cereal products, all claiming high fiber and added nutrition. Many of these cereals have added ingredients such as dried fruits, nuts, and other inputs in addition to the basic cereal grain. The added ingredients as well as the process of adding them increases total manufacturing costs.

Manufacturing and distribution costs account for about 90 percent of the price consumers pay for cereals and bakery products. Input prices for packaging, labor, energy, and advertising have increased this year. With input prices up, and more of these inputs being used, particularly advertising and promotion, basic costs are pushed higher and are reflected at the retail level. These costs have risen about 6 percent in 1989.

The CPI for cereals and bakery products is expected to rise at a slower rate in 1990 than in 1989. A lower farm value for food grains will contribute some to lower prices, but the expected slowdown in the general inflation rate will have the strongest influence on dampening prices. Nevertheless, consumer demand will remain strong for high fiber cereal products. As a result, the CPI for cereals and bakery products in 1990 is expected to rise 5 to 7 percent above 1989.

Fresh vegetables

Cold weather in California, Mexico, and a late freeze in Florida slowed fresh vegetable shipments in the first half of 1989, keeping prices high through June. Potato stocks were also tight as a result of the 1988 drought keeping potato prices sharply higher than last year. While salad type vegetable supplies have returned to more normal levels and prices have fallen, potato prices remain well above a year ago. Although potato production this year has been higher, fresh supplies will likely remain tight as potato processors use much of the added production to rebuild frozen and dehydrated stocks. As a result, fresh potato prices will remain strong through next year. Barring bad weather, supplies of other fresh vegetables will be larger next year and prices will remain near the levels of 1989.

Processed vegetables

Processed vegetable prices this year have been averaging more than 10 percent above 1988. Tight supplies of canned sweet corn, peas, green beans, and dried beans resulted from the 1988 drought. Supplies of canned tomato paste products were also short in the world market. While acreage for processing vegetables increased considerably this year, much of the added production will go for filling the market pipeline, and stocks of some vegetables may take another year to return to normal levels. Prices of a few vegetables, therefore, will likely remain strong for another year. All in all, however, the CPI for processed vegetables in 1990 will likely average below 1989.

Fresh fruits

The CPI for fresh fruits in 1989 will average slightly more than 7 percent above 1988. Retail prices for apples, oranges, and bananas averaged well above year earlier levels for most of the year. Apples, oranges, and bananas account for nearly half of the CPI for fresh fruit. In 1990, retail fresh fruit prices will rise at a slower rate. A larger apple harvest will help to dampen rises in apple prices. Although orange production in California will be larger this season, strong export demand will keep prices high. The CPI for fresh fruit in 1990 is expected to rise 5 to 7 percent above 1989.

Processed fruits

Demand for canned and frozen non citrus fruits has been relatively stable and prices have increased very little. Demand for orange juice, however, has been strong for both fresh squeezed juice and frozen concentrate. The CPI for all processed fruit will average about 4 percent above 1988. A large orange crop in Brazil will force juice prices down in the world market, keeping domestic frozen concentrated juice prices from rising next year. Other processed fruit supplies will be smaller next year because of smaller crops in California this past summer, particularly cling peaches. The rise in the CPI for processed fruit will be 3 to 5 percent above this year.

Food away from home

The CPI for food away from home has risen at a slower rate than the CPI for food at home. One reason for the slower rise is the strong competition among fast food firms in a market where sales gains have weakened. The policy among these firms has been to hold menu prices relatively steady, but to offer certain combinations such as a burger, fries, and drink for a lower price than the totaled individual menu prices. Similar price deals

have been promoted heavily throughout 1989 in an effort to boost sagging sales.

While the farm value of food has increased in 1989, the increase has less effect on away from home food prices than on prices of food in grocery stores. The farm value of food in grocery stores is about 30 percent of the retail cost while the farm value of food sold in restaurants and fast food establishments is about 17 percent. This is another reason that the CPI for food away from home rose at a slower rate than food at home.

The CPI for food away from home in 1990 is expected to rise at a rate of 3 to 5 percent above 1989. Lower increases in the farm value of food will mean food price increases away from home will be impacted primarily by the general economy.

Changes in Food Price Indicators, 1987 through 1990

	1987	1988	Forecast	
			1989	1990
Consumer Price Indexes			Percent	
All Food	4.1	4.1	5.7	3 to 5
Food away from home	4.0	4.1	4.7	3 to 5
Food at home	4.3	4.2	6.3	2 to 4
Meat, poultry, and fish	6.4	3.5	4.5	1 to 3
Meats	7.1	2.4	3.7	1 to 3
Beef and veal	7.6	5.5	6.5	1 to 3
Pork	8.2	-3.0	0.0	1 to 3
Other meats	6.3	2.6	3.1	2 to 4
Poultry	-1.5	7.2	7.7	-6 to -8
Fish and seafood	10.6	5.8	4.8	3 to 5
Eggs	-5.9	2.3	23.0	-14 to -18
Dairy products	2.5	2.4	5.7	0 to 2
Fats and oils	1.5	4.6	7.7	2 to 4
Fruits and vegetables	8.8	7.6	7.8	1 to 3
Fresh fruits	11.3	8.3	7.2	5 to 7
Fresh vegetables	12.9	6.3	9.7	0 to 2
Processed fruits & vegetables	3.5	7.9	6.7	0 to 2
Processed fruits	4.1	10.3	4.0	3 to 5
Processed vegetables	2.7	4.8	10.7	-3 to 0
Sugar and sweets	1.8	2.7	5.1	3 to 5
Cereals and bakery products	3.5	6.4	8.5	5 to 7
Nonalcoholic beverages	-2.6	0.0	4.2	3 to 5
Other prepared foods	4.2	3.7	6.6	3 to 5

Source of historical data: Bureau of Labor Statistics; forecasts by Economic Research Service.

Retail food prices in 1990 are expected to rise 3 to 5 percent above 1989. A slower rate of inflation in the general economy will slow the rate of increase in the costs for processing and distributing food. Disposable personal income is forecast to rise at a slower rate next year, holding consumer demand even with 1989. Large total supplies of red meats and poultry, improved supplies of fruits and vegetables, and larger supplies of food grains will keep rises in the farm value of food below 1989.

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SECOND REPORT ON NUTRITION MONITORING

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The National Nutrition Monitoring System (NNMS) includes all data collection and analysis activities of the Federal government associated with nutrition and health status measurements, food consumption measurements, food composition measurements, dietary knowledge and attitude assessment, and surveillance of the food supply. The second report on nutrition monitoring in the United States (1) was intended to review the dietary and nutritional status of the population, as well as the factors that determine status, based on the NNMS data and information available through the U.S. Departments of Agriculture (USDA) and Health and Human Services (DHHS). The report was developed at the request of DHHS and USDA in accordance with the provisions of a joint contract, No. DHHS 282-87-0051, with the Federation of American Societies for Experimental Biology (FASEB). It was prepared under the direction of the ad hoc Expert Panel on Nutrition Monitoring (EPONM), established by FASEB's Life Sciences Research Office (LSRO). Members of the EPONM are listed in the table below.

Expert Panel on Nutrition Monitoring

Milton Z. Nichaman, M.D., D.Sc.
Houston, Texas
Chairperson

C. Wayne Callaway, M.D.
Washington, D.C.

Ronald N. Forthofer, Ph.D.
Houston, Texas

Oral Capps, Jr., Ph.D.
College Station, Texas

Mildred Kaufman, M.S.
Chapel Hill, North Carolina

Catherine Cowell, Ph.D.
New York, New York

A. Catharine Ross, Ph.D.
Philadelphia, Pennsylvania

Peter R. Dallman, M.D.
San Francisco, California

Howard G. Schutz, Ph.D.
Davis, California

Contractual activities were overseen and assistance and data analyses were provided to the EPONM and LSRO by the Joint Project Steering Committee (JPSC). The JPSC consisted of representatives from each of the Agencies in DHHS and USDA concerned with nutrition monitoring (see list in the table below). Marie T. Fanelli-Kuczmarski, Ph.D., R.D., of DHHS and Susan M. Krebs-Smith, Ph.D., R.D., of USDA coordinated data analyses and other support activities in the Agencies.

Joint Project Steering Committee

Catherine E. Woteki, Ph.D., R.D.
National Center for Health Statistics
Project Officer and Chairperson

Frances Cronin, Ph.D., R.D.
Human Nutrition Information Service
USDA Liaison

DHHS Representatives:

Darla Danford, M.P.H., D.Sc., R.D.
National Institutes of Health

Gerry Hendershot, Ph.D.
National Center for Health Statistics

Linda D. Meyers, Ph.D.
Office of Disease Prevention and Health
Promotion

Frederick Trowbridge, M.D., M.Sc.
Centers for Disease Control

Elizabeth A. Yetley, Ph.D., R.D.
Food and Drug Administration

USDA Representatives:

Melody Bacha, M.P.H., R.D.
Food and Nutrition Service

Gerald F. Combs, Ph.D.
Agricultural Research Service

Patricia M. Guenther, Ph.D., R.D.
Human Nutrition Information Service

Phillip Kott, Ph.D.
National Agricultural Statistics Service

Betty B. Peterkin, B.S.
Human Nutrition Information Service

Susan O. Welsh, Ph.D., R.D.
Human Nutrition Information Service

Charge to the Panel

The charge given to the EPONM for the second report had that two themes:

- An updating of the dietary and nutritional status of the U.S. population as presented in the first report on nutrition monitoring (2), prepared in 1986 by the Joint Nutrition Monitoring Evaluation Committee (JNMEC), and
- An in-depth analysis of the contributions of the NNMS to assessment of the status of the population as determined from two types of data--data on diet and chronic diseases, represented by the relationship of dietary and nutritional status to cardiovascular disease, and data on dietary and nutritional problems, represented by assessment of iron nutriture.

With respect to the first theme, the EPONM was charged to update the first report by comparing data in that report with data from NNMS surveys that became available since the first report was written in 1986. The EPONM was also charged to address methodological issues in comparing data from different sources or times, and to identify the types of analyses necessary to make comparisons meaningful. Trend and baseline data presented in the first report were to be updated. The EPONM was to reevaluate the categorization of food components as to the completeness of relevant data and the level of monitoring status that should be accorded each food component. For brevity, this presentation will concentrate on the findings of the update portion of the second report.

As a followup to the 1986 JNMEC report, the second report was intended to identify new data available from the NNMS and to examine changes and trends in dietary intake, nutritional status, and nutrition-related health conditions. The JNMEC report emphasized a coordinated review of dietary data from the Nationwide Food Consumption Survey 1977-78 and nutritional and health status data from the second National Health and Nutrition Examination Survey. New national survey data on dietary intake and nutritional status of the entire U.S. population had not become available since the JNMEC report; however, data for certain subgroups of the population were available. Most of the available new data were for the Mexican-Americans in five Southwestern States, the Cubans in Dade County, Florida, and the Puerto Ricans in the metropolitan New York City area surveyed in the Hispanic Health and Nutrition Examination Survey and for the women and preschool children surveyed in the Continuing Survey of Food Intakes by Individuals 1985-86. The major sources of NNMS data considered by the EPONM included the surveys and surveillance activities listed below:

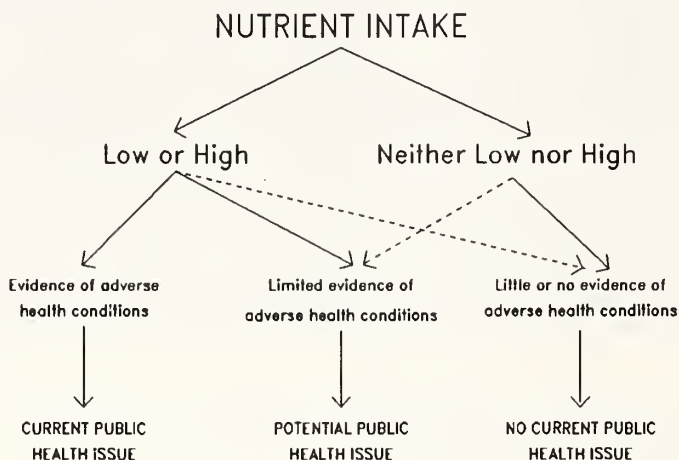
- Nationwide Food Consumption Survey (NFCS), 1977-78
- Continuing Survey of Food Intakes by Individuals (CSFII), 1985-86
- U.S. Food Supply Series, 1909-1985
- National Nutrient Data Bank
- First National Health and Nutrition Examination Survey (NHANES I), 1971-75
- Second National Health and Nutrition Examination Survey (NHANES II), 1976-80
- Hispanic Health and Nutrition Examination Survey (HHANES), 1982-84
- NHANES I Epidemiological Follow-up Study (NHEFS), 1982-84, 1986
- National Health Interview Survey (NHIS), 1985
- Total Diet Study
- Vitamin/Mineral Supplement Intake Survey, 1980
- Health and Diet Survey, 1982, 1984, 1986
- Pediatric Nutrition Surveillance System (PedNSS)
- Pregnancy Nutrition Surveillance System (PNSS)
- Behavioral Risk Factors Surveillance System (BRFSS)

Monitoring Priority Status for Individual Food Components

The availability of update data on dietary, nutritional, and health status from the various NNMS surveys for each food component varied. The data elements from the NNMS common to most of the food components were per capita amounts in the food supply and individual dietary intakes. The quality and quantity of data, as well as the availability of appropriate assessment criteria, differed for different components and influenced the confidence with which evaluations of status could be made. In assessing the monitoring priority status for individual food components, the EPONM assigned each component to one of the three categories listed below:

- Current public health issue.
- Potential public health issue for which further study is needed.
- Not a current public health issue.

A schematic diagram that illustrates the decision-making process used by the EPONM for categorizing food components is shown in the figure below. The choice to begin the evaluation of each food component with consideration of the dietary intake data was made recognizing that such data were available for most of the components included; the same was not true of related health data. However, as illustrated in the figure, the categorization of each food component was determined ultimately by evidence for the public health significance of associated adverse health consequences.



The new evidence available on dietary and nutritional status with respect to individual food components did not indicate substantial changes since the JNMEC report was completed in 1986. Consequently, the EPONM and JNMEC classifications of food components by public health monitoring priority were very similar. In the discussions of the classifications that follow, the criteria for assigning food components to the category are described, update data available related to the components are tabulated, and brief conclusions about each food component are presented. A "plus" in the table indicates data were available; a "minus" indicates they were not. The notation "limited" for food composition data indicates that analytical data were available for less than 75 percent of important sources of the food component.

● Food components were considered to be current public health issues

- if dietary intakes were low or high for a substantial proportion of the population, and if evidence from NNMS surveys of health and nutritional status indicated related health problems in the population or in subgroups of the population, or
- if dietary intakes were low or high for a substantial proportion of the population, and if evidence from epidemiological or clinical studies in the literature indicated related health problems in the population or in subgroups of the population.

Food components in this category were recommended for high priority monitoring status; that is, multiple assessments, when possible, should continue to be employed. The development of assessment tools, when these are lacking, was also given a high priority.

The food components listed in the following table were considered to be current public health issues.

Food component (current public health issue)	Food composition data	Dietary data	Health data
Food energy	+	Food supply Individual intake	Overweight and associated conditions
Fat	+	Food supply Individual intake	Serum cholesterol level
Saturated fat	+	Food supply Individual intake	Serum cholesterol level
Cholesterol	+	Food supply Individual intake	Serum cholesterol level
Alcohol	+	Disappearance/sales Individual intake (limited)	–
Iron	+	Food supply Individual intake	Mean corpuscular volume, transferrin saturation, erythrocyte protoporphyrin level, hemoglobin/hematocrit
Calcium	+	Food supply Individual intake	–
Sodium	+	Individual intake (limited)	Blood pressure

Reported dietary intakes of food energy by adults were lower than Recommended Energy Intakes (3), but the data available from the NNMS on the high prevalence of overweight (approximately one-fourth of adults) in many groups suggested a continuing public health problem in regard to energy balance. Food energy should be accorded high priority for monitoring status. Additional information on both energy intake and energy expenditure (physical activity) is required to evaluate the relative impact of these factors on the occurrence of overweight and obesity.

The intakes of total fat, saturated fat, and cholesterol by many persons in the U.S. population exceeded levels recommended by many authoritative groups. Serum cholesterol levels are affected by dietary intake of these components, as well as other factors. Elevated levels of serum cholesterol were prevalent (11–22 percent) in men and women of all racial and ethnic groups examined; these levels represent a risk factor for the development of coronary heart disease. Continued priority for the monitoring of serum cholesterol levels and the dietary intake of fat, fatty acids, and cholesterol is warranted.

Self-reported alcohol intakes were high (an average of 1 ounce or more of ethanol per day) in a large number of persons (9 percent of adults). The public health and social consequences of excessive alcohol intake are sufficiently grave that continued efforts to improve monitoring of alcohol intake are warranted.

Iron intakes were low for many in the population, especially for women of childbearing years. Although the prevalence of iron deficiency has apparently declined in recent years, it was still relatively high in vulnerable groups (up to 14 percent) such as women of childbearing years. Continued monitoring is warranted and is likely to yield useful information on iron nutritional status because of the wealth of indicators available for inclusion in the NNMS.

The low intakes of calcium in vulnerable groups, especially women, suggested a reason for concern. The high prevalence and severity of osteoporosis, which is possibly related, in part, to calcium intake of adolescents and young women, provided sufficient evidence for a public health concern. The EPONM concluded that calcium should be considered a nutrient about which there is public health concern even if its exact role in health disorders is uncertain. Monitoring the intake of calcium and including assessments of bone status in NNMS surveys is warranted, as is investigating the possible overuse of calcium supplements by adults.

Reported dietary intakes of sodium were high in many persons relative to estimates of safe and adequate levels of intake, even though reported intakes did not account for all sources of sodium. The prevalence of hypertension, which is related in some persons to sodium intake as well as other factors, was high in all adult groups examined (14–44 percent). Because of the serious, and largely preventable, deleterious effects of elevated blood pressure, a high level of monitoring effort is warranted. Blood pressure measurements should continue to be included in surveys and efforts to improve and validate the assessment of total sodium intake should be pursued.

- **Food components were considered to be potential public health issues, for which further study is needed,**
 - if dietary intakes were low or high for a substantial proportion of the population, and if limited evidence from either NNMS nutrition and health surveys or studies in the literature suggested related health problems in at least some subgroups in the population, or
 - if dietary intakes were adequate for the majority of the population, but limited evidence from either NNMS nutrition and health surveys or studies in the literature suggested related health problems in at least some subgroups in the population, or
 - if dietary intakes were low or high for a substantial proportion of the population, and if evidence was not available from either NNMS nutrition and health surveys or studies in the literature that permitted evaluation of the public health significance of the observed dietary intakes.

Food components in this category were recommended for moderate monitoring priority status, with continued assessment at the least in subgroups suspected to be at risk, and moderate priority for the development of improved assessment techniques. The type of additional study required for each component differed; for example, basic research on the health consequences of low or high intake, additional data on food composition or dietary intake, or the development of assessment techniques or interpretative criteria may be needed.

The food components listed in the following table were considered potential public health issues, for which further study is needed.

Food component (potential public health issue)	Food composition data	Dietary data	Health data
Dietary fiber	+ (limited)*	Individual intake	-
Vitamin A	+	Food supply Individual intake	Serum retinol level
Carotenes	+	Food supply Individual intake	-
Folacin	+	Food supply Individual intake	Serum and red blood cell folate levels
Vitamin B6	+ (limited)*	Food supply Individual intake	-
Vitamin C	+	Food supply Individual intake	-
Potassium	+	Food supply Individual intake	-
Zinc	+	Food supply Individual intake	-
Fluoride	-	-	Dental caries

* Less than 75 percent analytical data for important sources of the food component.

Intakes of dietary fiber were low in relation to suggested levels of intake, but the impact of these low intakes could not be judged on the basis of available data. More information is required on the health effects of dietary fiber, the content in foods of various components of fiber (which have different physiological effects) as well as total dietary fiber, and recommendations for intake. Monitoring is recommended as this information is developed.

The content of vitamin A in the food supply and individual intakes indicated general adequacy. Intake and status may, however, warrant continued monitoring efforts in certain groups. HHANES data on low serum vitamin A levels suggested that poor young children, particularly Mexican Americans, may be such a group. Greater attention needs to be given to studying the relationships of biochemical assessments of status to functional impairments. Carotenes were also considered a potential public health issue for which further study is required. Data on intake of carotenes were available from the CSFII 1985-86 and will be available from HHANES to provide a baseline for assessing future changes in intake. Future surveys should continue to collect and report intake

separately for carotenes and total vitamin A. Additional research is needed on the health effects of consumption of specified levels of total carotenes, as well as individual carotenes.

Vitamin B6 intakes were lower than recommended levels for a substantial number of persons, especially women. In order to interpret the consequences of these intakes, further study is needed on the content and bioavailability of vitamin B6 in foods, vitamin B6 requirements, and biochemical or other techniques for assessing vitamin B6 nutritional status. Increased monitoring activity may be warranted as progress is made in these areas.

Recent dietary intakes of vitamin C appeared to be adequate in most of the population, even without consideration of the substantial contribution of vitamin C supplements. Data for serum vitamin C from NHANES II indicated that the prevalence of low serum vitamin C levels is generally higher in groups with low socioeconomic status, especially older men, but did not provide strong evidence for vitamin C deficiency. Although these data suggested the need for some continued surveillance, changes in vitamin C fortification practices may affect intake among many segments of the population. Continued monitoring is warranted to assess the impact of these changes, but the apparently adequate intakes did not provide support for priority monitoring status.

Folacin intakes were much lower than recommended in some groups, especially women. Biochemical and other evidence for deficiency was limited, but suggested a risk of deficiency in women. Further study is required to evaluate folacin requirements, to develop methods and interpretative criteria for folacin nutritional status, and to examine the status of groups at risk.

Potassium intakes were lower than recommended levels in a substantial number of persons in the population. Further research on the role of potassium intake in the regulation of blood pressure and on the assessment of potassium status is needed to elucidate the public health significance of the low intakes observed.

Zinc intakes were lower than recommended levels in some groups, particularly women. The possibility of impaired zinc status was not supported by available biochemical or clinical data from the NNMS. However, findings from the clinical literature have suggested zinc deficiency in some groups in the United States. The significance of the observed low dietary intakes of zinc cannot be evaluated until additional research to determine zinc requirements and to develop better measures of zinc status is conducted. Further monitoring is warranted.

Fluoride intake may be too low in some groups to provide maximal benefit for the prevention of dental caries, but NNMS data were not available that permit evaluation of this possibility. Assessments of fluoride intake that take all sources into account are warranted.

● Food components were not considered to be current public health issues

- if dietary intakes were adequate for the majority of the population, and evidence from either NNMS nutrition and health surveys or studies in the literature did not suggest related health problems in the population, or
- if dietary intakes were low or high for a substantial proportion of the population, but evidence from either NNMS nutrition and health surveys or studies in the literature did not suggest related health problems in the population.

Food components in this category were recommended for lower monitoring priority status; continued assessment should include, at a minimum, estimation of dietary intake. Assignment to this category does not necessarily indicate that there are no associated health problems, but that the national prevalence of such conditions was known or expected to be low.

The food components listed in the following table were not considered to be current public health issues.

Food component (not a current public health issue)	Food composition data	Dietary data	Health data
Protein	+	Food supply Individual intake	-
Carbohydrate	+	Food supply Individual intake	-
Vitamin E	+ (limited)*	Food supply Individual intake	Serum alpha- tocopherol level
Thiamin	+	Food supply Individual intake	-
Riboflavin	+	Food supply Individual intake	-
Niacin	+	Food supply Individual intake	-
Vitamin B12	+ (limited)*	Food supply Individual intake	-
Phosphorus	+	Food supply Individual intake	-
Magnesium	+ (limited)*	Food supply Individual intake	-
Copper	+	Food supply Individual intake	-

* Less than 75 percent analytical data for important sources of the food component.

Protein intakes appeared to be adequate for almost all persons and there was no evidence of health problems associated with deficiency or excess. Monitoring should continue at a low level, especially for the elderly.

Carbohydrate intakes were lower than may be desirable, based on the dietary pattern recommended in the U.S. dietary guidelines (4), but the evidence did not suggest that current intakes pose a specific public health problem. Monitoring of intake should continue; if recommended decreases in the percent of energy from fats occur, concomitant increases in the proportion of energy from carbohydrates would be expected.

Although some vitamin E intakes were lower than recommended levels, especially in women, NNMS data on serum alpha-tocopherol levels and clinical data on the rarity of vitamin E deficiency suggested little reason for a public health focus. Interpretation of serum alpha-tocopherol levels is confounded by other factors such as serum lipid concentrations, and clear interpretative guidelines to assess marginal vitamin E status do not yet exist.

Intakes of thiamin appeared to be adequate, and no other evidence suggested a public health problem with respect to thiamin status.

Intakes of riboflavin appeared to be adequate, and no other evidence suggested a public health problem with regard to riboflavin status.

Individual intakes of preformed niacin appeared to be adequate, and additional niacin may be obtained from the conversion of dietary tryptophan in the body. No other evidence suggested a public health problem in relation to niacin status.

Intakes of vitamin B12 appeared to be adequate for the majority of the population. Clinical or biochemical evidence for a public health problem with respect to vitamin B12 deficiency was not available. Further monitoring, at a low level, is warranted.

Phosphorus intakes appeared to be adequate, and no other evidence existed to suggest a public health problem. Monitoring should continue at a relatively low level.

Magnesium intakes appeared to be low, but there were no other data on magnesium status available and magnesium deficiency is very unlikely to result from low dietary intake alone. Further research on magnesium requirements and assessment of magnesium status would be desirable. Current information supports continued monitoring at a low level.

Copper intakes appeared to be low in a large number of persons in the population. Despite some unanswered questions about the estimation of intake and the assessment of status, the likelihood of a public health problem associated with copper was judged to be very low. Monitoring should continue at a low level, unless further research suggests more compelling reasons for concern.

Major Conclusions

The EPONM drew the following conclusions based on their review of new NNMS data:

- In the United States today, the amounts of food available in the food supply and the nutrient content on a per capita basis are generally adequate to prevent undernutrition and deficiency-related diseases. Although some Americans may not have sufficient food for a variety of reasons, the supply of food that is available is abundant.
- The NNMS did not provide sufficient population-based data to permit a full assessment of nutritional status in some groups for whom there are special concerns about nutritional status, such as young infants and pregnant and lactating women. In addition, some other groups whose nutritional status may reasonably be suspected to differ from that of the general population, such as the homeless, institutionalized persons, migrant workers, and Native Americans living on reservations, were not included in most of the current household-based surveys of the NNMS. Finally, very little information on the dietary and nutritional status of the elderly (a group for which standards for nutrient adequacy and normal physiologic status have not been established with certainty) was available in the recent NNMS data that were the focus of this evaluation.

- Analyses of data from the U.S. food supply and from surveys of individual food consumption have provided evidence that some changes are occurring in eating patterns consistent with recommended dietary guidelines for Americans to avoid too much fat, saturated fat, and cholesterol and to consume adequate amounts of starch and dietary fiber (4). For example, recent data indicated that consumers are increasingly choosing some lower-fat alternatives within the meat and dairy product food groups and are increasing their consumption of grain products.
- The principal nutrition-related health problems experienced by Americans continued to be related to the overconsumption of some nutrients and food components, particularly food energy, fat, saturated fatty acids, cholesterol, sodium, and alcohol.
 - The high prevalence of overweight noted among adults in the United States is evidence that energy intakes exceeded energy expenditures (probably because of low energy expenditures, although this possibility could not be assessed using current NNMS data). However, reported intakes of food energy did not exceed the Recommended Energy Intakes (3). The JNMEC noted that more than one-quarter of the adult U.S. population were overweight, based on data collected in NHANES II. Data collected in the HHANES also indicated high prevalences of overweight (26–42 percent) in three Hispanic groups not previously studied, especially in Mexican-American and Puerto Rican women (40 and 42 percent, respectively). Overweight is a controllable risk factor for cardiovascular disease, high blood pressure, and diabetes (5,6).
 - Intakes of total fat and saturated fat continued to be higher than the levels recommended by many authoritative groups; cholesterol intakes were high for adult men. The interpretation of trends in fat intake was problematic because of changes in survey methods over time. High prevalences (11–22 percent) of elevated levels of total serum cholesterol, as defined by the 1984 NIH Consensus Development Conference (7), were noted in nearly all sex and ethnic or racial groups of adults aged 20–74 years. Elevated serum cholesterol levels constitute an important controllable risk factor for coronary heart disease (5,6).
 - Sodium intakes also exceeded recommended levels in almost every population group in the United States. Such intakes are of concern because of the sensitivity of blood pressure in some persons to sodium intake. Hypertension was prevalent (14–44 percent) in adult groups aged 20–74 years. Hypertension is a controllable risk factor for cardiovascular disease and stroke (5,6).
 - Although consumption of excessive alcohol did not appear to be prevalent in a large proportion of the population, reported intakes were high for a large number of Americans and the serious nature of the health and social consequences of such intakes justifies public health concern.
- In spite of the general adequacy of the supply of nutrients, there was evidence of inadequate individual dietary intake and/or impaired nutritional status in some subgroups in the population with respect to some vitamins and minerals.
 - Iron deficiency continued to be the most common single nutrient deficiency, even though some recent hematological and biochemical evidence from the NNMS suggested that its prevalence has declined in children aged 1–5 years. The variety of measures of iron nutritional status collected in the NNMS permits estimation of the prevalence of impaired iron status by several models (8). Among groups that were assessed adequately in the NNMS, women of childbearing years and young children were at greatest risk for iron deficiency. The prevalence of iron deficiency anemia assessed in NHANES II and HHANES was less than 5 percent; however, the prevalence of iron deficiency without anemia was appreciable, up to 14 percent, in some groups.

- Although less evidence was available, the calcium status of women was judged to be a concern. The high prevalence of osteoporosis in later life is suggestive that the calcium intake of many women may be inadequate to permit the accretion of maximal bone mass in early adulthood and/or to maintain bone mass later in life.
- Limited evidence from biochemical assessments suggested that the vitamin A, vitamin C, and folacin nutritional status of some subgroups of the population might be improved.
- Intakes of zinc and vitamin B6 were low, and poor status has been reported in some population groups in the clinical literature, but further study is needed to assess the health consequences of the reported intakes in U.S. population groups.
- The risk of nutrition-related disorders was generally greater in low-income groups than in groups with higher incomes.
 - The prevalences of both overweight and iron deficiency were greater in women below poverty than in women above poverty.
 - The intakes of several vitamins and minerals were lower in persons below poverty than in persons above poverty. This finding was also highlighted in the low-income component of the CSFII 1985-86. Women in the low-income survey had lower intakes of food energy than women in the all-income survey. Intakes of vitamin E, vitamin B6, folacin, calcium, magnesium, iron, and zinc were low in women in both surveys, but lower in the low-income survey than in the all-income survey. Low-income women and children who lived in households that participated in the Food Stamp Program had nutrient intakes that were generally the same or higher than those of low-income women and children living in households that did not participate in the program.
- The ability of the EPONM to examine excessive intakes of vitamins and minerals was limited because the available NNMS surveys that assessed nutrient intake from food did not include quantitative estimates of nutrient intake from vitamin/mineral supplements.
- Although the data available to the EPONM for their update on dietary and nutritional status of the U.S. population were not equivalent to the data reviewed by the JNMEC in terms of the population groups surveyed, the conclusions of the EPONM are very consistent with those of the JNMEC. The results of recently completed and ongoing national surveys of dietary and nutritional status by USDA and DHHS will provide a more extensive database for further evaluation of the nutritional status of the U.S. population and various subgroups in future reports on the NNMS.

Recommendations

Based on their experiences in analyzing NNMS data for the second report on nutrition monitoring, the EPONM offered recommendations to strengthen the NNMS in several areas:

- Improving the comparability of nutrient composition data and coding used in dietary surveys.
- Testing the impact of methodological differences on survey results.
- Using a common core of sociodemographic descriptors in all NNMS surveys.
- Introducing greater similarities in NNMS data reporting.

- Investigating methods for assessing population groups currently excluded from the NNMS.
- Improving coverage of some groups at nutritional risk: infants, pregnant women, lactating women, the elderly, preschool children, and adolescents.
- Improving measures of usual dietary intake in the HANES.
- Collecting information on the impact of knowledge and attitudes on patterns of food consumption and nutrient intake.
- Obtaining quantitative information on vitamin and mineral supplement use to better estimate total nutrient intake.
- Improving estimates of alcohol consumption.
- Improving response rates and analyzing nonresponse.
- Educating data users in the proper use of data from complex surveys.
- Being more responsive to the needs of State and local data users.

Many of these recommendations have already been adopted in recent ongoing monitoring activities such as the 1987–88 Nationwide Food Consumption Survey and the third National Health and Nutrition Examination Survey.

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USDA'S NUTRIENT DATA BASE FOR NATIONWIDE DIETARY INTAKE SURVEYS

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One of the most important functions of dietary intake surveys is to provide information on average nutrient intakes for the designated population groups. This task is performed through use of average, or representative, nutrient composition data for the foods consumed by survey respondents. Nationwide dietary surveys conducted within the Federal government's National Nutrition Monitoring System use a nutrient data base especially designed and maintained for this purpose by the Human Nutrition Information Service (HNIS) of the U.S. Department of Agriculture (USDA).

The nationwide surveys using this data base are--

- (1) USDA's large Nationwide Food Consumption Survey (NFCS) which takes place every 10 years. The most recent NFCS was conducted in 1987 and 1988. The previous NFCS took place in 1977.
- (2) The Continuing Survey of Food Intakes by Individuals (CSFII), a smaller survey conducted by USDA that was initiated in 1985 and 1986 to track consumption between the larger decennial surveys. Continuing surveys were not conducted in 1987 and 1988 while the NFCS was underway, but resumed this year and are planned annually until the next NFCS begins.
- (3) The National Health and Nutrition Examination Survey (NHANES III) conducted by the Department of Health and Human Services' National Center for Health Statistics. Interviewing for NHANES III began last fall and will continue through 1994.

This paper focuses on this nutrient data base and includes information about data base organization and documentation, data sources, and the automated process for generating updates to the data base. It also includes information about how individuals can access the nutrient data base for their own projects.

The current operating version of this data base contains almost 6,000 items. Foods have been organized to facilitate summarization of dietary intake data by food groups. Each food has a 7-digit numeric code in which the first position represents one of nine major food groups. Positions 2 and 3 represent subgroups. For example, all foods with "5" in the first position are grain products or mixtures with grain as the major ingredient, those beginning with "51" are yeast breads or rolls, and those beginning with "512" are whole-wheat yeast breads or rolls.

The Survey Nutrient Data Base includes data for foods in the forms in which they are generally consumed. For example, both raw broccoli and cooked broccoli are present, but only cooked forms of pork are included. Data for mixtures of foods are also included, with as much detail and for as many different variations as needed to distinguish among those with different nutrient profiles. For example, 14 different types of lasagna are in the data base: eight fall under the subgroup of "Grain Mixtures, Bread or Dough Dishes," and six are classified as "Diet Frozen Meals" within the subgroup of "Frozen Plate Meals with Grain as the Major Ingredient."

The nutrient values for each item are given for 100 grams of the edible portion of the foods. These values are translated into the amounts of nutrients in the portions consumed using information from a computerized "Manual of Food Codes for Individual Intake." The Manual, which can stand alone as an important resource data base, provides a complete description of each food item on the data base, as well as information on weights of common portions for each food.

The current data base includes data for energy and the 28 food components listed below. For the NFCS in 1977, this list included energy and 14 nutrients. It was expanded to the current 28 in 1985 in time for the first CSFII. In selecting the food components to include on this data base in 1985, the key consideration was the needs of the scientific community, but, by necessity, adequacy of available data was taken into account. The final selection was made jointly by HNIS and the National Center for Health Statistics.

The 1977 nutrient data base included data for the following items:

Energy	Ascorbic Acid
Protein	Thiamin
Total fat	Riboflavin
Carbohydrate	Niacin
Calcium	Vitamin B-6
Iron	Vitamin B-12
Magnesium	Vitamin A (IU)
Phosphorus	

In 1985 data for the items listed below were added.

Moisture	Copper
Total Saturated Fatty Acids	Zinc
Total Monounsaturated Fatty Acids	Folacin
Total Polyunsaturated Fatty Acids	Vitamin E
Alcohol	Vitamin A (RE)
Total Dietary Fiber	Carotenes (RE)
Sodium	Cholesterol
Potassium	

The nutrient profiles are developed by nutrient data specialists at HNIS who operate the National Nutrient Data Bank. Data that go into the Data Bank and are ultimately used for the Survey Data Base are collected from many sources. Data are contributed by food companies, by trade associations, and by government and university laboratories. Some analyses are performed under contract with USDA by commercial or university laboratories. Appropriate data are also selected from scientific literature. All data from any of these sources are evaluated for their reliability, and only those meeting the established criteria are entered into the Data Bank. When sufficient data exist for a food item, they are summarized into a representative nutrient profile for the item. These nutrient profiles are made available to the public through Agriculture Handbook No. 8, "Composition of Foods...Raw, Processed, Prepared," and its corresponding computer file, the USDA Nutrient Data Base for Standard Reference. For the last several years, revisions to Handbook 8 have taken place for one or two food groups at a time. As the revision to a food group has been completed, it has been published as a separate section of the handbook. Approximately once a year, data from newly revised sections are incorporated into the computerized USDA Nutrient Data Base for Standard Reference.

Survey Nutrient Data Base System

The Standard Reference Data Base, which is used by most computerized dietary analysis systems in the United States today, is the main source of data for the Survey Nutrient Data Base. HNIS uses a special information system to generate or update the Survey Nutrient Data Base, and data needed for the survey have been imported from the Standard Reference Data Base into the Primary Data Set (PDS), which is a part of this system. There are also items on the PDS used only for the purpose of calculating nutrient content of mixed foods from recipe components; for example, baking powder is not consumed as a food item but is included on the PDS because it frequently is used as an ingredient in food mixtures.

Values were added to the PDS for the nutrients missing from the Standard Reference Data Base, such as carotene. Complete nutrient profiles were added for missing food items. If analytical data were not available for the

missing items, the values were imputed from other forms of the foods or were estimated from data for similar foods. Included with each value on the PDS is a code to indicate whether or not it is from the Standard Reference Data Base and whether it is based on analytical data or is an imputed value. A date is also included with each value not from the Standard Reference Data Base to indicate when it was added to this data set. Documentation is maintained about the source of every value added to the PDS. For each estimated value, documentation includes information about its derivation.

The other major components of the survey nutrient data base system are the recipe file, a table of retention factors, and the computer program that updates the data base. Each of these components is discussed briefly below.

Recipe File. The recipe file is the controlling file within the survey data base system. In this file, each survey food code is linked to one or more PDS item through a set of recipe codes. Approximately half of the recipes are actually direct links to the PDS. For example, the survey food code for whole milk is linked to the PDS item for whole milk. However, the survey food code for apple and cabbage salad is linked to the PDS items for cabbage, apples, and mayonnaise. Recipes contain information about changes in moisture or fat that occur during cooking, as well as information about the recipe ingredients, i.e., names, identification numbers, weights, and codes for accessing retention factors if applicable.

Table of Nutrient Retention Factors. This data set contains factors for calculating retention of 18 vitamins and minerals during cooking. The factors are organized into food categories, and each category is assigned a code for computer access. For example, the categories, computer access codes, and a sample of the retention factors for pasta are:

Code	Food and Cooking Method	thiamin retention (%)
0380	Pasta, baked	80
0381	Pasta, boiled, drained	65
0382	Pasta, boiled, drained, baked	55
0384	Pasta, boiled, not drained	80
0385	Pasta, reheated	95

Computer Program. The computer program uses the recipe file to determine what items will appear on the survey data base and which sets of nutrient values from the PDS will be used for each item. For one-component recipes, i.e., direct links between the survey and PDS, nutrient values are moved directly from the PDS to the survey data base. For multicomponent recipes, the values are calculated from data for the ingredients. Nutrient retention factors are accessed and used in the calculations when appropriate. The recipe calculation procedure is the same one used by the Nutrient Data Bank to calculate recipes for Agriculture Handbook No. 8.

For the survey data base, recipes containing salt as an ingredient were calculated both with and without the salt, and both sets of nutrient values appear on the data base. A special field in each record indicates if a set of values was calculated directly from the recipe or calculated by omitting salt from the recipe. Recipes including fat as an ingredient or recipes involving the absorption of fat during cooking were calculated in several ways--by using data for the type of fat specified in the recipe and also by substituting data for several other types of commonly used fats. For example, if a recipe normally uses butter as the ingredient, the nutritive values were calculated by using butter as the ingredient and also by using nine other fats, including three vegetable oils, shortening, lard, three margarines, and one margarine-like product. Complete sets of nutrient values for these different calculations are included in the survey data base.

The entire data base is updated before each USDA food consumption survey. The first step in the process is to update the PDS with the most current version of the Standard Reference Data Base. For example, the version of the Standard Reference used for the 1985 survey was release number 5; the version used for the 1987 survey was release number 7. The difference between the two versions was that release 7 contained updated data from revised Handbook No. 8 sections for beverages, legume products, and fish and shellfish products.

During 1988-89, updated information on beef and eggs were processed through the Nutrient Data Bank. These data will be available soon in Handbook No. 8 revisions and Standard Reference updates, but for the interim new beef and egg values were inserted directly into the PDS. Thus, the Survey Nutrient Data Base was updated as quickly as possible, and NFCS results will be based on these newer data.

During the course of a survey, when new food items are reported by survey respondents, special forms are submitted to USDA. An interdepartmental food code committee, with representatives from both HNIS and NCHS, reviews these forms and decides what new food items should be added to the data base. When a new item is needed, a new code is assigned and the request for development of the nutrient profile is forwarded to HNIS nutrient data specialists. A new recipe is developed and inserted into a small temporary recipe file. If additional data are needed, they are obtained, or estimated if necessary, and placed on the PDS with appropriate codes and dates. The file of new recipes is periodically processed through the system. The resulting nutrient values are merged into the survey data base, and the corresponding new recipes are merged into the main recipe file.

Maintaining the data base is a complicated process. It must reflect improvements that are made to nutrient data and recipes, as well as changes in food products such as a new fortification level of iron in an existing

breakfast cereal. HNIS maintains computerized records of changes to the various components of the Survey Nutrient Data Base System. As surveys take place from year to year, or as the NHANES III progresses through several years, these records will be referenced to help determine how changes in foods have affected the nutrient intakes of individuals.

The benefits of the Survey Nutrient Data Base system go beyond the obvious ability to quickly update the data base. Another benefit of particular significance is the ability to convert data on the consumption of mixed foods into data on the consumption of PDS items. This conversion is possible by using the recipe file that designates the amount of each food component in mixed food items. Consumption data for the PDS items serve two important functions. They permit studying nutrient contribution at the primary food level, and they also provide a mechanism for evaluating the nutrient values on the PDS.

For example, using food consumption data from the 1985 CSFII and the recipe file in the survey data base system, amounts of mixed foods consumed were converted into amounts of ingredients consumed. Consumption data for foods at this primary food level were then aggregated. For each nutrient in the data base, the minimum number of PDS food items required to reach 80 percent of the total intake of the nutrient was determined. For most nutrients, 100-200 foods account for 80% of the consumption of the nutrient.

The nutrient values on the PDS for these foods were then evaluated to determine the greatest needs for nutrient analyses. Based on this evaluation, a project was conducted in 1987 to improve the analytical nutrient base for the survey. Generally, the items analyzed were frequently consumed foods and foods that were major contributors of nutrients for which intakes were below the RDA in the 1985 CSFII. Emphasis was placed on analysis of vitamin E, since its analytical base was not as strong as those for other food components.

A second project is underway in which all nutrient values for 20 key foods are being analyzed as a check against the values currently being used. This project is a pilot study for a more extensive project tracking a larger set of foods which are major contributors of all food components reported by the surveys. This larger set of foods will be developed from results of the 1987-88 NFCS.

Plans are underway to add more nutrients to the data base. Expansion of the PDS to include individual fatty acids should be completed, and the addition of selenium should begin next year.

Agriculture Handbook No. 8

As previously described, the Survey Nutrient Data Base is linked to Agriculture Handbook No. 8 through the Primary Data Set and the USDA Nutrient Data Base for Standard Reference. To facilitate future updating of the handbook, the current edition is published in sections according to food groups, in loose-leaf format, one food item to a page. Complete sections may be updated if needed. When revisions are needed to only a few items within a section, they will be published in annual supplements to the handbook. These supplements, the first of which will appear in 1989, may include information for several different food groups. This information may be (1) revised data, which will be in the form of replacement pages; and (2) newly published data, which can be inserted into the looseleaf books at the appropriate places.

As previously mentioned, new data for eggs and beef were recently incorporated into the survey data base, and these data will soon be published in revisions of Handbook No. 8. New data for eggs, which showed lower cholesterol than previously reported, were received at HNIS in spring of 1989; summaries of these data will appear in the first supplement to Agriculture Handbook No. 8.

When it became apparent that the cholesterol values for eggs were too high and that these were based on the older colorimetric method, Nutrient Data Bank nutritionists immediately began investigating cholesterol values for other foods. They found that most of the cholesterol values used for Agriculture Handbook No. 8 and the Standard Reference Data Base were determined by newer chromatographic methods. For several foods whose cholesterol values were based on the older method, newer data were located to verify the accuracy of existing values, and most were found to be accurate. Steps have been taken to have new analyses run on the few foods that could not be verified.

A complete revision to the Agriculture Handbook No. 8 section on beef products is underway to reflect current retail market practices relative to the amount of external fat removed from beef cuts. In this revision, data will be presented for two different levels of fat trim: 1/4-inch remaining fat and "0 inch" remaining fat. The survey data base reflects the average trim level as determined by a study in which the amount of external fat found on various cuts was measured in a nationwide sampling of supermarkets. The data representing this average, approximately 1/8 inch of remaining external fat, were calculated for the survey by developing recipes with appropriate proportions of beef trimmed to 1/4 inch and 0 inch of remaining external fat.

Data Base Access

A great deal of interest has been shown in the Survey Nutrient Data Base as a possible data base for automated dietary analysis systems. It is already being used in an important new system that is under development jointly by HNIS and the University of Texas School of Public Health in Houston. In fact, all of the components of the Survey Nutrient Data Base system are used--the recipe file, the Primary Nutrient Data Set, the Table of Nutrient Retention Factors, and the recipe calculation program. The new joint system will maintain the integrity of the USDA data base but will allow users to add additional foods and nutrients. It also provides options of using the USDA recipes, modifying the USDA recipes, or entering new recipes.

The new joint system includes programs for use with both detailed food records and food frequencies. It will include on-line interactive procedures for both food intake and recipe coding. Plans are already underway to make this system available to the USDA Human Nutrition Research Centers. Once all phases are complete, other government agencies, and then private organizations, will have access to it as well.

As an essential component of the National Nutrition Monitoring System, the Survey Nutrient Data Base will be kept current to meet the needs of both CSFII and NHANES III. New foods will be added when they are reported on either survey, and updated nutrient values will be incorporated as they become available through Handbook No. 8 revisions. Data for priority nutrients will be added to the data base as they are identified and research completed to provide the necessary values. HNIS believes that the Survey Nutrient Data Base will become an important research tool during the 1990's, and other organizations are encouraged to explore the possibility of adapting it to meet their own needs.



Outlook '90, Session #13

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OUTLOOK FOR OILSEEDS

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If the 1988/89 oilseed year maybe characterized as a year of disruptions and adjustment, then 1989/90 may be characterized as a year of returning to normalcy. The drought of 1988 led to adjustments on a number of fronts, most notably on prices and exports. The prospect of a 1.937 billion bushel soybean crop in 1989 points to a return to supply, use, and price levels that characterized much of the 1980's. This is not to say that the current marketing year, or 1990 will replicate 1987/88. More than anything else, exports of soybeans and soybean meal will lag behind pre-drought levels. This is because even though U.S. production bounced back in 1989, the rest of the world continued to change.

Today, I will briefly review 1988/89, present the 1989/90 oilseed outlook pointing to factors that will shape 1990 decisions, and describe some of the forces that will direct oilseed markets in the 1990's. I will also deviate from the standard practice of limiting discussion to soybeans, by briefly reporting the outlook for other domestic oilseeds.

Review of 1988/89

The 1989/90 situation and outlook is the product of long term trends in oilseed production and short run deviation from these trends. Slide I shows a short but representative history of total oilseed production. World oilseed production continues to trend upward but the upward strength comes from foreign not U.S. oilseed production. The slide also shows the deviation in U.S. oilseed production associated with the 1988 drought and the 1989 recovery. The next slide shows more dramatically the trends and deviations specifically for soybeans. U.S. soybean production since 1985 has been flat or decreasing, South American production increasing, and other foreign production slowly increasing. The effects of the 1988 drought and the 1989 recovery are clear.

The 20-percent decrease in U.S. production led to substantial adjustments in prices and use. Prices for soybeans, other oilseeds, and protein meals were

sharply higher during 1988/89, not unlike those seen with the 1983 drought. Soybean exports fell by a third; soybean meal exports fell by a fourth. Our competitors, notably Brazil, were there to replace U.S. exports. This was especially true for soybean meal. Crushing fell and domestic meal use decreased. Extremely tight ending stocks of soybeans were forecast but we ended up with a not-so-tight 182 million bushels on September 1.

The Outlook for 1989/90

Let us examine soybean plantings in 1989 first to see why 1989 production and supplies are what they are, and second to see what growers' behavior in a year of high prices and special planting flexibility might suggest for 1990 and beyond.

This slide shows U.S. soybean planted acres trending downward until 1987 followed by small increases in acres in 1988 and 1989. Although more soybean acres will be harvested in 1989 than 1988, yields will be about a bushel lower than 1985-87. Production is estimated at 1.937 billion bushels, supply at 2.1 billion.

When U.S. growers were making their 1989 planting decisions they were reacting to a number of signals. First, the outlook, for the Brazilian crop was very good but the status of the Argentine crop was unclear but pointing toward a poor crop. Second, the November 89 soybean futures contract traded above \$7.00 from January through April, and was still over \$6.30 for almost all of May and June. Third, sign up for a flexible planting program referred to as "the 10-25 program" was underway. The program established by the Disaster Assistance Act of 1988, offered the possibility that farmers could plant 10 to 25 percent of their permitted acres of program crops to soybeans or sunflowers. Fourth, a lower acreage reduction program for wheat, 10 percent compared with 27.5 percent the year before, increased the potential for double-cropping soybeans. Fifth, USDA and others were forecasting the lowest ending stocks in over a decade. Farmers will be reacting to the 1990 version of these signals when making their 1990 planting decisions.

The grower response to these and other signals, and spring weather was to plant 60,475,000 acres, an increase of 1.5 million acres from 1988. Let us examine this 1.5 million acre increase in the context of the 10-25 program, which may be offered in 1990.

The Secretary of Agriculture was required to offer the 10-25 program in 1989 but he was also directed to scale back the allowed acreage if it was anticipated that the full sign up would result in a 1989/90 season average price less than \$5.49 per bushel. Growers signed up 3.5 million acres for soybeans. USDA announced that only 80 percent of the sign up would be permitted, reducing the potential soybean acres under 10-25 to 2.8 million.

This slide shows the potential increase in soybean acres under 10-25 and the change in total soybean acres between 1988 and 1989 by region. At this time we do not know how many acres actually were planted under 10-25; we know only the change from all sources -- 10-25, double-cropping, and other response.

We can tell that the increase in soybean acres in the Eastern and Western Corn Belts was significantly below the potential under 10-25. Apparently, the expected returns to soybeans were not high enough or certain enough to displace much corn even with the base protection afforded by the 10-25 program. In the Southeast where the potential increase from the 10-25 program was nearly 100,000 acres, the year-over-year increase was 570,000 acres. Most of the increase in soybean plantings appears to be double-cropping (450,000-500,000 acres) in response to the lower wheat ARP and favorable prices. The March Prospective Plantings report and the 10-25 signup indicated an increase in planted acres in the Delta but this was not realized. Unfavorable weather partially explains the decrease.

The point of this is: the flexibility provided by the 10-25 program probably had only a small effect on soybean acreage. Offering the program in 1990 will probably have an even smaller effect because forecasts of higher ending stocks, 335 million bushels versus 145 million, and of a record South American soybean harvest in 1990 point to a weaker soybean price outlook than in 1989.

What does the demand side look like for 1989/90? U.S. soybean exports will increase to 575 million bushels (15.65 MMT) (slide). This is only about 70 percent of pre-drought soybean exports. Foreign exports will also increase, but world trade in soybeans will remain below 1985-87 levels, primarily because of smaller U.S. exports. Domestic crush will improve over 1988/89 because of improved domestic meal demand and strengthening oil markets. Foreign crush is expected to show a larger percentage increase than the United States. Crush will be higher in a number of countries. In Brazil and Argentina record carry-over stocks will support a larger crush; in the EC smaller availabilities of rapeseed and sunflowerseed, and improved crush margins will boost the crush.

Domestic soybean meal demand will be strong -- perhaps 21.3 million tons. Expanding poultry production and reduced availability of alternative proteins, mostly cottonseed, underlie the forecast growth in domestic meal use. This slide shows soybean meal exports will be little changed from last year's level, perhaps 5.1 million short tons (4.63 MMT). Strong competition from South American producers, both this fall and probably again next summer, will limit U.S. soybean meal exports.

As shown in this slide the average price received by farmers for 1989/90 is forecast to lie in a range of \$5.00 to \$6.00 per bushel. This slide shows prices falling significantly in years that follow drought-affected marketing years, that is, after 1980, 1983, and 1988. The chart also shows, that at least in recent history, prices fell again the following year. Forecast growth in ending stocks to 335 million bushels points to weaker prices in 1990/91.

What is the outlook for the soybean oil sector? The higher crush expected in 1989/90 will increase oil production 4 percent and supply will approach 14 billion pounds. The interesting story with oil is the strengthening domestic

demand. Domestic disappearance of soybean oil slipped 3 percent in 1988/89. Soybean oil lost domestic markets to cottonseed, corn, sunflowerseed, and rapeseed oil. Soybean oil will recapture market share in 1989/90 with domestic use forecast at a record 11 billion pounds. On the trade side, U.S. soybean oil will compete in world markets characterized by larger foreign soybean oil production and record palm oil production. U.S. export prospects are for about 1.4 to 1.5 billion pounds of soybean oil. This is a decrease from the estimated 1988/89 exports. But the prospect for strengthening exports beyond 1989/90 exists because vegetable oil consumption increases are forecast to exceed production, drawing down stocks.

Although soybean oil continues to dominate the domestic fats and oils sector, other oils have shown significant growth. This slide shows the change in domestic use for a number of oils and for animal fats between 1984/85 and forecast 1989/90 levels. Soybean oil use increased more than a billion pounds in 5 years. The more important changes may be the growth in rapeseed oil (labeled canola on the slide), and corn oil, and the decrease in animal fats.

Canola oil use increased more than 400 million pounds. This growth relates to a number of factors. First, FDA granted canola Generally Recognized As Safe status, opening the door for its use in food products. Second, canola oil became more price competitive with soybean oil in 1986 and remains so. Third, the low saturated fat content of canola oil has attracted consumer interest. Virtually all canola oil used in the United States is imported from Canada.

What are the prospects for canola production in the United States in the 1990's? USDA does not report data on U.S. rapeseed production but oilseed industry estimates range from 65,000 to 150,000 acres. Given the right factors -- good oilseed markets (especially stronger oil prices), accommodating farm legislation that would enable canola to compete on a market returns basis rather than against program based returns, development of a marketing infrastructure and crushing plants, and speedy adaptation of livestock and poultry feeders to rapeseed meal -- the United States could become a significant canola producer in the 1990's. Canola is not likely to replace soybeans as the United States' primary oilseed.

Corn oil is the second largest oil used in the United States with domestic disappearance over 1 billion pounds a year. Because corn oil is a by-product of corn milling for products such as high fructose corn syrup, ethanol, corn snacks, and cereals, its supply depends on factors which don't affect oilseeds. The forces driving production of ethanol, corn sweeteners, and other products will determine the supply and competitiveness of corn oil in the 1990's.

Domestic use of animal fats -- lard and edible tallow -- is still larger than use of any oil except soybean oil. Domestic disappearance of lard has remained relatively steady, but edible tallow has drifted downward in the late 1980's. In a market where total domestic use of fats and oils grows about 2 to 3 percent a year, fats have yielded market share to vegetable oils. If this trend continues it will offer some support to the oilseed sector.

Factors to Watch in 1990

Nineteen-ninety will be the last year growers will make planting decisions under the Food Security Act of 1985. At this point the same basic factors that influenced plantings in 1989 should be watched in 1990. The combined production in Argentina and Brazil could be a record 31 million metric tons. This portends downward pressure on soybean and soybean product prices once the South American crop enters world markets. Forecast September 1 stocks of 335 million bushels also point to less price strength. As mentioned before, the 10-25 program if offered in 1990 will likely attract few acres. Farm programs for 1990 will continue to offer more attractive returns to cotton and feed grains than to soybeans.

Modification of the wheat program for 1990 is expected to affect soybean acres in 1990. Prediction of the net effect is complicated. The 1990 wheat program permits growers to plant up to 105 percent of their base. Plantings beyond 95 percent reduces eligibility for deficiency payments on an acre for acre basis. At the same time, each additional wheat acre up to 100 percent of base reduces costs of conserving use plantings. What does this mean for soybeans? Lower wheat ARP's increase the potential for double-cropping soybeans. However, some winter wheat growers might expand their wheat acres onto some normally single-cropped soybean acres. This outcome could reduce next year's soybean planting if wheat prevents soybean plantings next spring. Confusing the issue is the possibility that growers could choose not to harvest some winter wheat and proceed with soybeans. Even with more wheat acres available for double cropping, it seems likely that growers will be facing lower planting-time soybean prices than in 1989. This could be the more important factor and lead to fewer double-cropped acres in 1990. Spring wheat plantings in excess of base could displace some soybean acres especially if a combination of strong wheat prices and weak soybean prices prevail at planting time. The impact of spring wheat competition with soybeans is likely to be relatively small.

What does all this translate into for 1990 soybean acres? Compared with a year ago when the question was how large the increase in soybean acres will be, the question now is how large the decrease in soybean acres will be. Market fundamentals point to fewer acres in 1990. Soybean acres are more likely to resemble 1987 or 1988 plantings than 1989 plantings. A surge in exports beyond what is currently forecast would tend to counter the downward forces on acres.

The Outlook for Other Oilseeds

Sunflowers

Sunflowers were eligible for the 10-25 program in 1989. In the five States included in USDA's Crop Production report on sunflowers, 340,000 acres were signed up, most in North Dakota. There was no scale back as there was with soybeans. Instead of increasing in 1989, sunflower plantings decreased over 200,000 acres to 1.8 million acres. Unfavorable soil and weather conditions at planting probably accounts for some of the decrease. Smaller sunflowerseed supplies in 1989 will lead to smaller use.

The modified wheat program could cut into 1990 sunflower acreage. Based on experience with the 10-25 program in 1989, a repeat of the program in 1990 is likely to have only a small effect on sunflower production.

Cottonseed

Estimated 1989 cottonseed production is 4.7 million tons, down sharply from 1988 because a higher ARP reduced plantings, higher than normal abandonment, and slightly lower yields. Even with the smaller output direct feed use is expected to be maintained near last year's level. Adjustments will come in reduced crush and stock drawdown. The outlook is for more acres and larger cottonseed production in 1990 because of a cut in the ARP from 25 to 12.5 percent. Acres should be near the 12.5 million planted in 1988, the last time the ARP was 12.5 percent.

Peanuts

In 1989 growers planted the largest peanut area since 1958. The important story for peanuts is that the strong growth in domestic food use during 1988/89 is forecast to continue in 1989/90. Record food use of 2.325 billion pounds is forecast for 1989/90. This corresponds to 9.3 pounds per capita. Some of the growth in domestic food use is coming from the Temporary Emergency Food Assistance Program (TEFAP) acquisitions of peanut butter but there also is growth in demand for other peanut products. Exports improved in 1988/89 and should grow again in 1989/90. Significant export competition from China and Argentina will continue in the 1990's.

Summary

* For soybeans 1989 production, supply, and domestic use represents a return to normalcy after the disruption of the 1988 drought. Exports are not returning to pre-drought levels largely because of the size and timing of South American competition. The average price received by farmers is forecast between \$5.00 and \$6.00 a bushel in 1989/90.

* If our 1989/90 domestic and foreign forecasts hold true, then weaker prices and fewer soybean acres are likely in 1990. The 10-25 program appears to have had little effect in 1989, and if offered in 1990 little acreage response is expected given the prospect of weaker soybean prices.

* Foreign oilseed production will continue to expand in the 1990's.

* Soybean oil will continue to be our dominant domestic oil, but the right circumstances could see canola and corn oil capturing market share.

* Increased cottonseed area and production is expected in 1990. Weaker prospects for soybeans and more cottonseed production in 1990 mean less overall strength in the oilseed market which will not encourage sunflower expansion. Domestic edible and export demand for peanuts is forecast to increase in 1989/90; growth is expected to continue in the 1990's.

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SOYBEAN COMPLEX-FEATURES TO WATCH IN 1990

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Soybeans have staged a price recovery this fall based on a perception of improving world demand, uncertainty over South American plantings and seasonal considerations - as soybeans have a tendency to make seasonal lows during the August-October period.

We must not forget, however, that this recovery comes in the face of what could be a burdensome U.S. soybean carryover for 1990 of 325-350 million bushels. The ratio of U.S. supplies to the previous year's usage for 1989-90 has recovered sharply at 1.27 (2,119 million bushels/1,668 million bushels) versus .90 last year. While not high relative to the ratio of 1.40 in 1985, it reflects more than adequate supplies, Chart 1. An overshadowing affect this fall was the availability of an additional 3 million tonnes of South American soybeans as of September 1 versus 1988, some 7 million more than in 1987. Those supplies and the resulting increased shipments of soybeans and meal have restricted U.S. soybean and meal exports this fall.

The economic function of the market since mid-1988 has been to ration usage in line with reduced supplies because of U.S. and Argentine production losses. That is clearly evident in Chart 2 which compares the percentage change from the previous year of combined soybean meal equivalent (SBME) shipments, soybeans plus meal, from the U.S., Brazil and Argentina on a monthly basis. Shipments have consistently fallen below year ago levels since May 1988. Recoveries in September 1988 and January 1989 were short-lived. On an October-September basis, 1988-89 combined SBME trade was down 4.2 million tonnes from 1987-88 or the equivalent of 154 million bushels. Preliminary October data suggests that SBME shipments were up 21%. While soybean meal shipments were still down 1 percent, soybean shipments rose 57 percent. Weekly data suggest that the recovery may have continued into early November. This early improvement could be deceiving. We must continually monitor the overall level of SBME shipments, watching to see whether they reflect stock rebuilding or actual consumption. As noted on Chart 3, October SBME shipments of 3.7 million tonnes were near historic highs. In other years shipments have not continued for long at this level. During October-November 1981,

following the tight supply situation of 1980-81, combined SBME shipments rose 37% only to fall back to a more modest gain of 7% during December-January. Our current 1990 U.S. soybean carryover projection of 344 million bushels is based on a recovery of 18% in world trade during 1989-90 (October-September) plus modest South American 1990 production figures of 20.5 million tonnes for Brazil and 10.3 million for Argentina.

As for world SBME demand, along with an assumed recovery in Japanese and Taiwan purchases, the European Economic Community (EEC), USSR and Eastern Europe will be key areas to watch. A recovery in Eastern Europe will be a function of the tremendous political and economic reforms taking place. Eastern Europe was an importer of 4 million tonnes of SBME from the U.S., Brazil, Argentina and the EEC in 1983-84, but in 1987-88 imports fell to only 3.1 million, with 1988-89 imports calculated at only 2.5 million. Our 1989-90 demand forecast assumes a recovery to 3.5 million tonnes, which could be optimistic, chart 4.

As illustrated in accompanying chart of EEC quarterly imports (Chart 5), expanding production of oilseeds has dramatically reduced their SBME imports over the last few years. However it should be noted that imports August-October 1989 have recovered to a record 5.5 million tonnes versus 3.7 million last year and near 4.5 million in each of the preceeding three years. With lower oilseed production in 1989, 1989-90 SBME imports from the U.S., Brazil and Argentina are expected to recover to 19.0 million tonnes versus 16.3 in 1988-89 and in line with 1987-88 imports.

In the tight supply year 1984-85 the USSR curtailed SBME imports, partly because of supply considerations but also due to transportation logistical problems, Chart 6. That has not been the case in 1988-89 as SBME imports expanded to 4.2 million tonnes. For 1989-90 we have assumed a trend increase to 4.8 million. We can only watch and see whether financial restraints might limit imports or political ramifications force even higher imports. So much for demand, which must continually be monitored.

Combined soybean production from Brazil and Argentina has grown steadily over the last decade from 13.9 million tonnes in 1979 to 29.8 MMT in 1989, Chart 7. Prior to the 1980s, Brazilian and Argentine production was equivalent to less than 30% of U.S. output. Based on our current South American forecasts it would equate to 58%. The need for foreign currency and dramatic room for acreage expansion should keep that total climbing. Financial and economic conditions in Brazil have raised some major uncertainties about plantings this year. The proposed release of 4.5 billion cruzados to help producer financing and, more importantly, creative financing by the co-ops now suggest that acreage may be unchanged to down 5%. The government and co-ops have a vested interest in making sure Brazilian soybean production is at a maximum level. South American weather conditions have been good to date with Argentina recovering from some of its early dryness. South American soybean production is an emotional issue that will be a market factor through late January possibly February. Assuming

combined production of 30.8 million tonnes, South American supplies could be a burden to the market March forward.

Assumming U.S. March 1 soybean stocks of 1,135 million bushels combined supplies of U.S., Brazil and Argentine soybeans next spring could set a new record over 63 million tonnes. The level of demand improvement will then be measured against those world supplies.

U.S. March 1 soybean stocks of 1,135 million bushels would be sharply above last years stocks of 890 million and in line with 1988 stocks of 1,146 million bushels. A ratio of stocks to the previous six months usage ratio of 1.23 would be at the mid-range of historical levels, comparing to the lower levels of 1.00 and 1.01 in 1989 and 1988, Chart 8. We have used that factor plus others in examining soybean values. The accompanying scatter study, chart 9, relates July soybean futures price highs during the December-February period to the U.S. March 1 stocks/usage ratio. The 1981 point is not applicable as prices were still working lower from their 1980 drought-induced-highs. During the 1979 and 1980 periods prices were unusually high as demand went through a tremendous expansion. It should be noted that in 1980 prices dropped to the \$6.00 level in April. Basis the other years and our current perceived ratio of 1.23, July futures may struggle at the \$6.30-6.50 level.

While we realize strong demand can force prices higher, they may be quick to retrace when demand subsides. South American weather scares could create temporary rallies. The perception of price resistance would change relative to any perceived changes in the stocks/usage ratio. Price pressure after the South American harvest could carry July futures back below their contract low of \$5.785. Strength of demand and U.S. weather will be key issues to those spring lows.

U.S. weather patterns will assume an ever-increasing price shaping role beginning in May and stretching through the summer months. While longterm weather forecasting is still in its infancy, and more of an art than precise science, I personally believe that at least some U.S. soybean growing areas could again experience crop problems in 1990. Acreage shifts to corn and cotton, due to favorable price relationships, could conceivably reduce U.S. soybean plantings to 58 million acres in 1990 versus 60.5 planted in 1989. This year the USDA allowed producers the option of planting 10-25% of their feedgrain base to soybeans without penalty or loss of base acreage. The deficit reduction package passed by Congress offers that option again in 1990, but current price relationships would likely not encourage a repeat of increased plantings. U.S. soybean yields averaged 33.7 bushels per acre during the three years 1985 thru 1987. Despite early dry conditions in 1989, late rains allowed U.S. soybean yields to average 32.8 bushels per acre. An average yield of 33.5 bushels per acre is not an unjustifiable assumption for 1990, with chance it could be higher. With each 1 million acres equal to only 30-34 million bushels, depending on yield, and each bushel yield equal to 56-59 bushels, depending on acreage, yield changes are much more important to the supply situation.

Based on harvested acreage of 56.8 million acres and yield of 33.5 bushels per acre, 1990 U.S. soybean production would equal 1,904 million bushels. While it is difficult to estimate 1990-91 usage, it can be noted that production at that level would exceed 1989-90 estimated usage of 1,774 million bushels and result in an additional carryover buildup in 1991. See accompanying supply/usage balance in Table 1.

Rallies next summer will have to be evaluated in the context of the prospective 1990-91 supply/usage situation. With a probable loan rate of \$4.50 in the fall of 1990, depending on farm bill changes, this year's price low of \$5.40 for November soybeans could be easily broken if a large crop is realized. A price recovery next fall might not be as dramatic if demand has already improved, reducing the potential for growth.

One must never forget that soybean oil and meal prices are closely tied to soybean values plus the crush margin. Oil as a percentage of product value will determine the relationship of meal and oil prices. In the past several years, burdened by surplus oil stocks, the nearby oil contract has traded between 28-35% of product value.

U.S. soybean oil stocks set new records in each of the past three years, peaking at 2,902 million pounds in February 1989. Chart 10. 1988-89 ending stocks of 1,715 million pounds fell below 1987-88 ending stocks of 2,092 million. 1989-90 offers a chance to lower stocks further, but not to the levels experienced in 1984-85 which contributed to a major bull market. It is our opinion that U.S. soybean oil exports for 1989-90 could remain high and are currently forecast at 1,645 million pounds. The key to the stocks situation, however, could be a recovery in domestic soybean oil usage estimated at 11.1 billion pounds versus 10.6 in 1988-89. A decline in cottonseed oil availability and lower imports of palm oil could promote that increase. (Soybean meal production is also a relevant factor that must be watched.) Our SBO ending stocks forecast for 1989-90 is 1,306 million pounds. Table 2. Soybean oil could conceivably trade above 35 percent of product value.

Historically 18-19 cents is relatively cheap for soybean oil and has encouraged consumption. Availability of palm could be burdensome factor, but this will have to be assessed against surging PRC and USSR demand.

Soybean meal values at \$190-\$200 are historically high. A full recovery in U.S. domestic meal usage is expected in 1989-90 to 21.2 million tonnes versus 19.8 in 1988-89. Table 3. U.S. exports are forecast at 5.3 million tonnes, but will depend upon the level of demand improvement and exact size of South American production. There is plenty of crush capacity to meet current domestic and export needs. USSR purchases could spark rallies, only to have prices retrace their gains. Seasonally we look for downward pressure in meal March-May, when South American supplies move to the world markets.

I hope the thoughts and ideas presented will give each of you a better understanding of the soybean situation. The soybean market offers a dynamic environment with constantly changing demand inputs and production prospects for soybeans, meal and oil. While circumstances may change, altering our price scenario I have always prided myself in being able to constantly evaluate price/value under changing conditions.

CHART 1
RATIO OF U.S. SOYBEAN SUPPLIES SEPT 1
VERSUS PREVIOUS YEARS USAGE

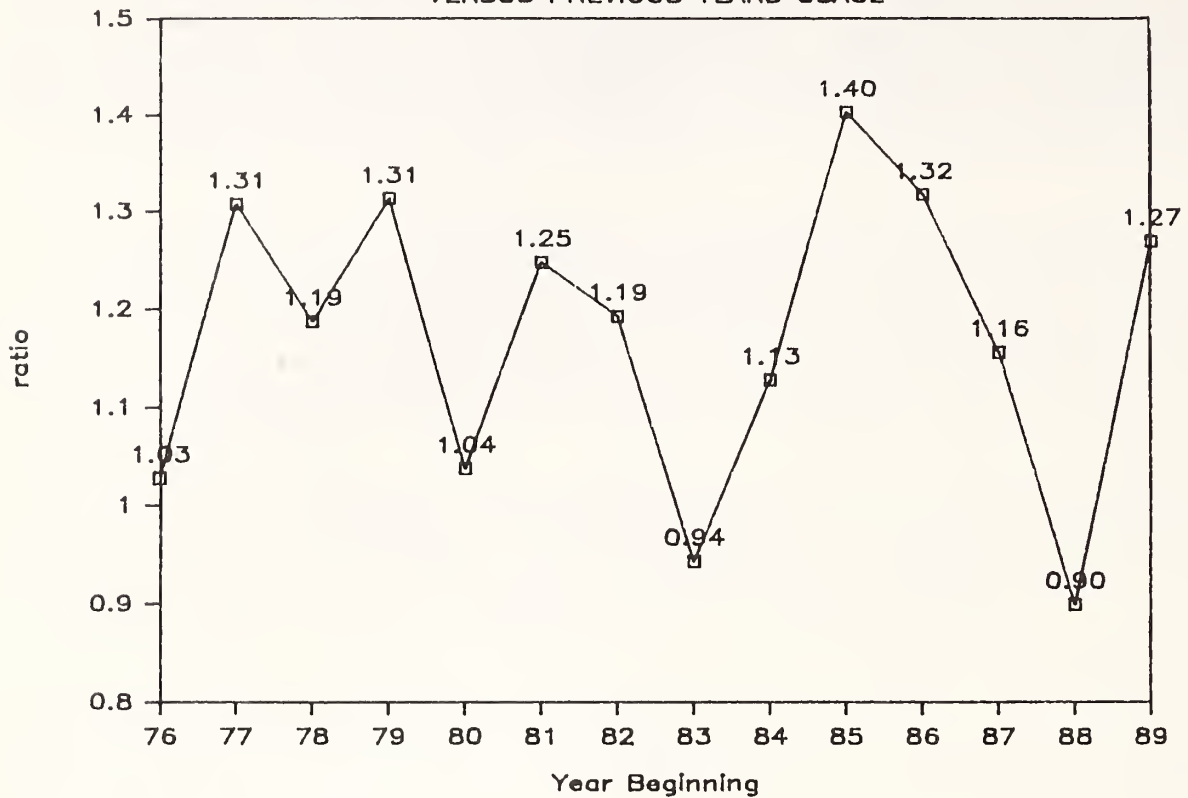


CHART 2

COMBINED SBME SHIPMENTS

U.S., BRAZIL, ARGENTINA

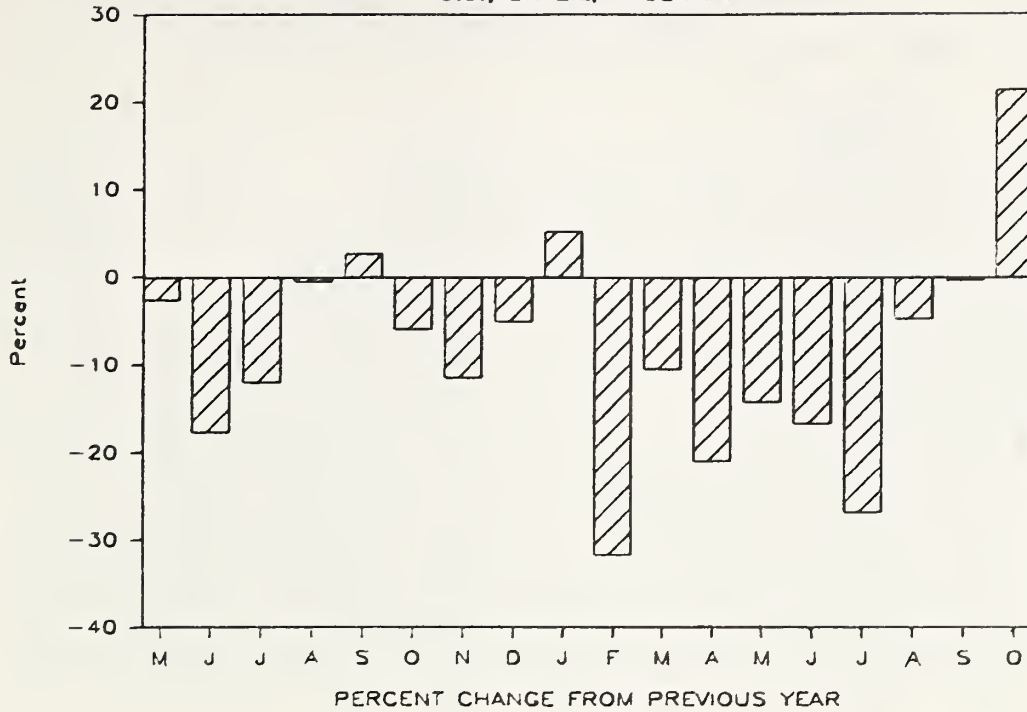


CHART 3

COMBINED MONTHLY SBME SHIPMENTS

U.S., BRAZIL AND ARGENTINA

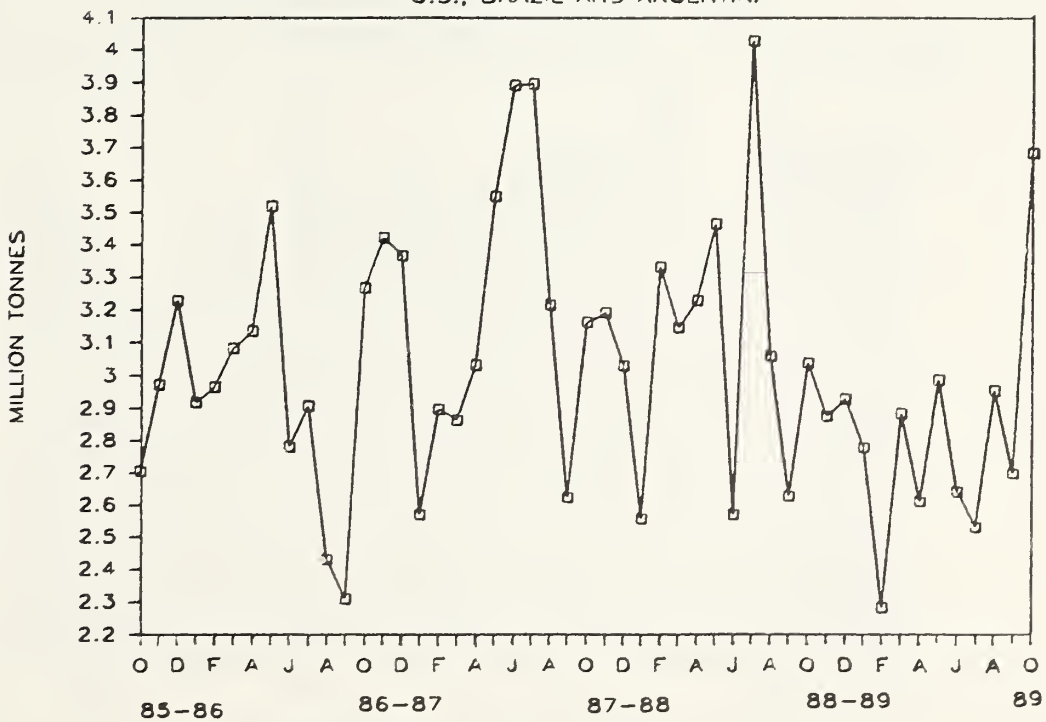


CHART 4
EASTERN EUROPE SBME IMPORTS
FROM U.S., EEC, BRAZIL and ARGENTINA

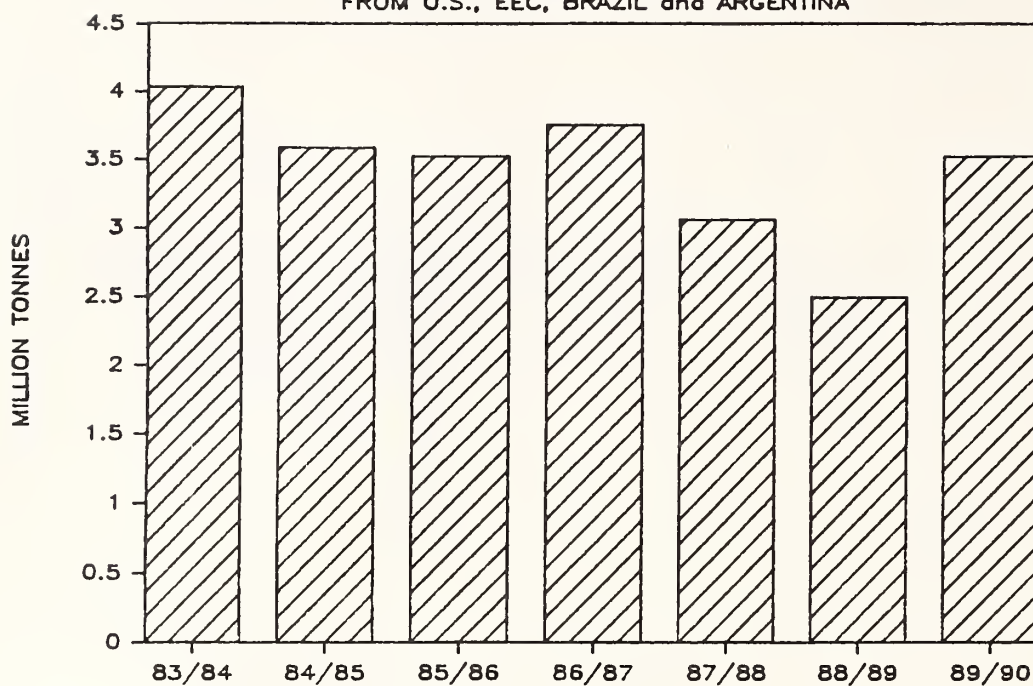


CHART 5
EEC QUARTERLY IMPORTS
SOYBEAN MEAL EQUIVALENT

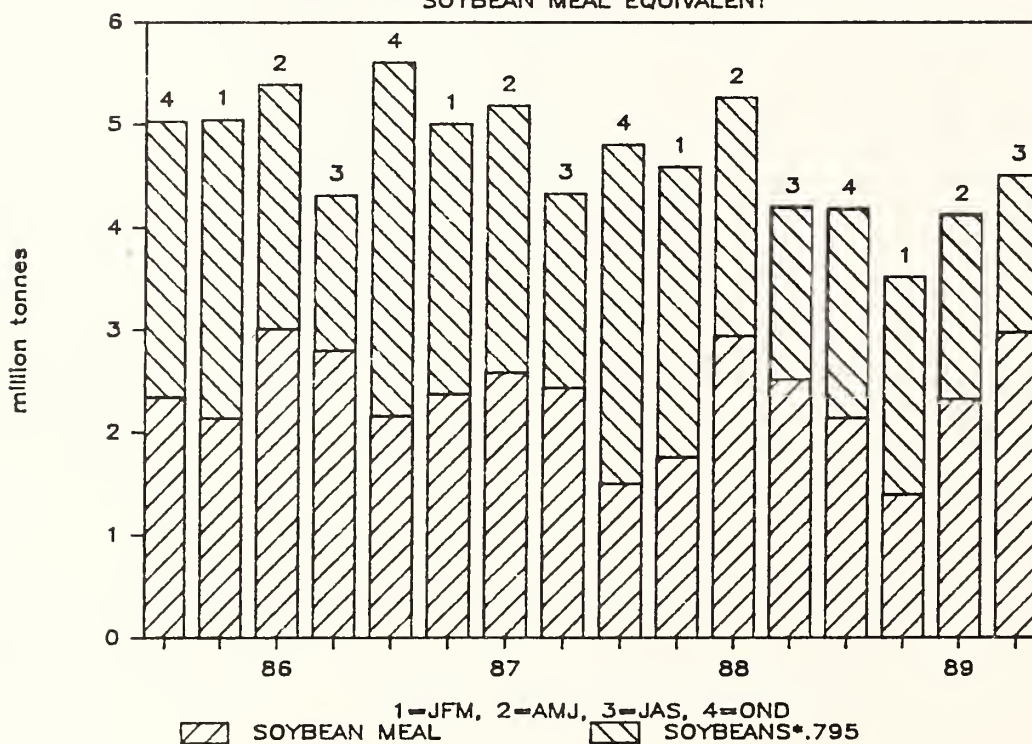


CHART 6

USSR SOYBEAN MEAL EQUIVALENT IMPORT FROM U.S., EEC, ARGENTINA AND BRAZIL

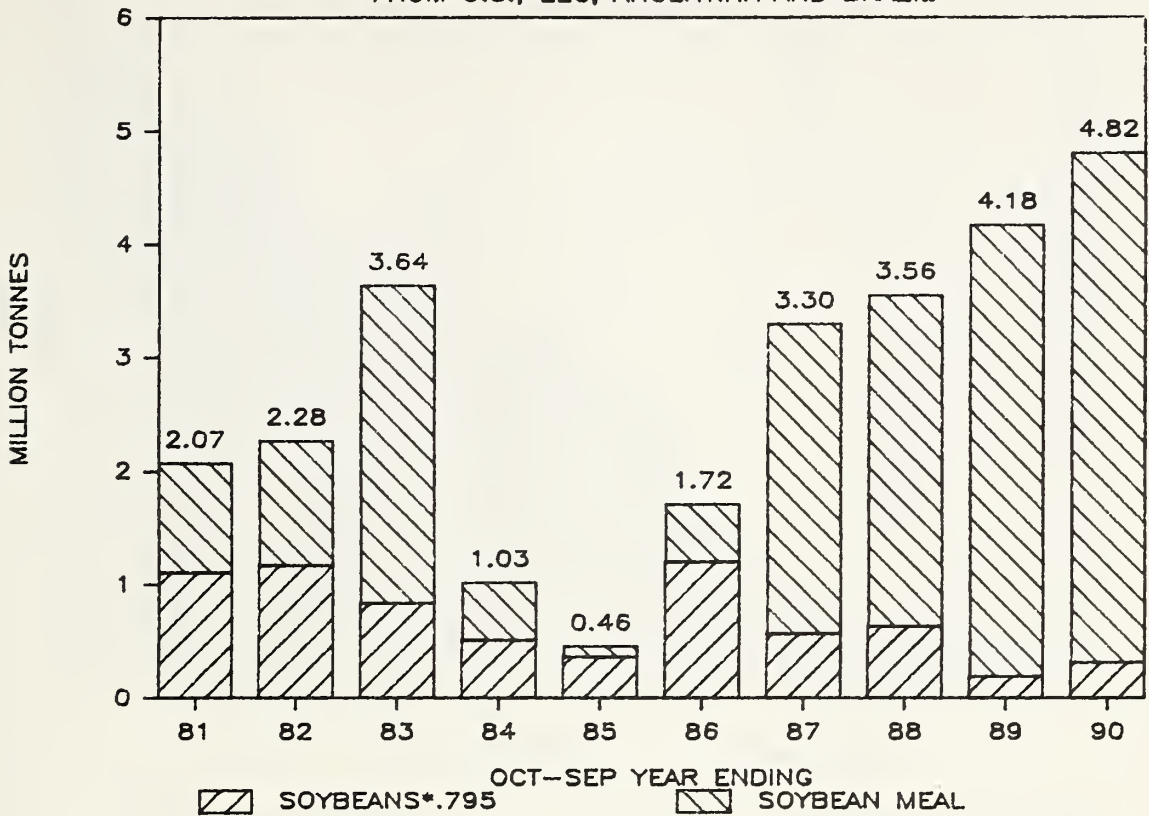


CHART 7

SOUTH AMERICAN SOYBEAN PRODUCTION

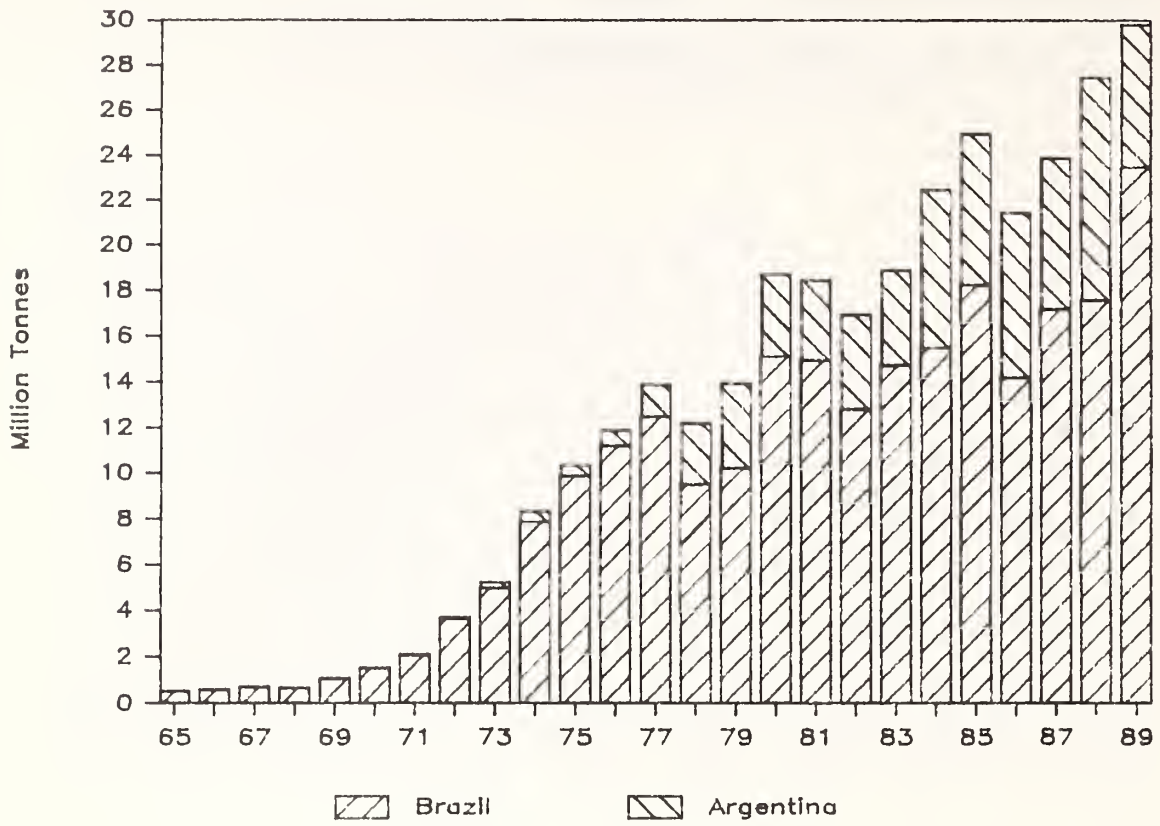


CHART 8
MARCH 1 U.S. SOYBEAN
STOCKS/USAGE RATIO

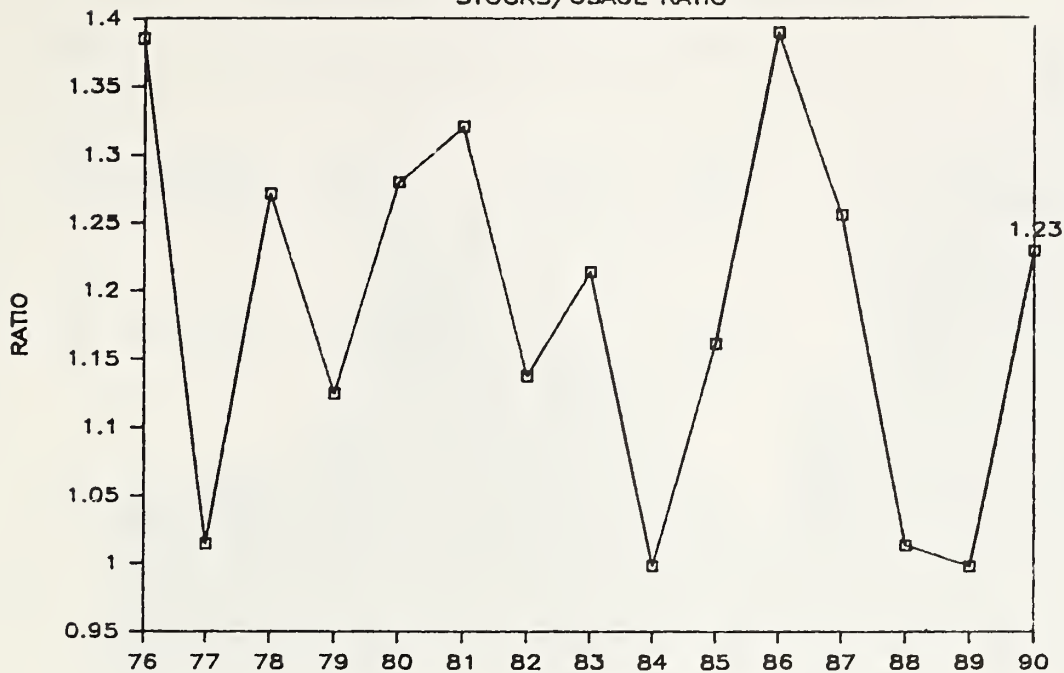


CHART 9
JULY SOYBEAN FUTURES PRICE HIGHS
DURING DEC-FEB PERIOD

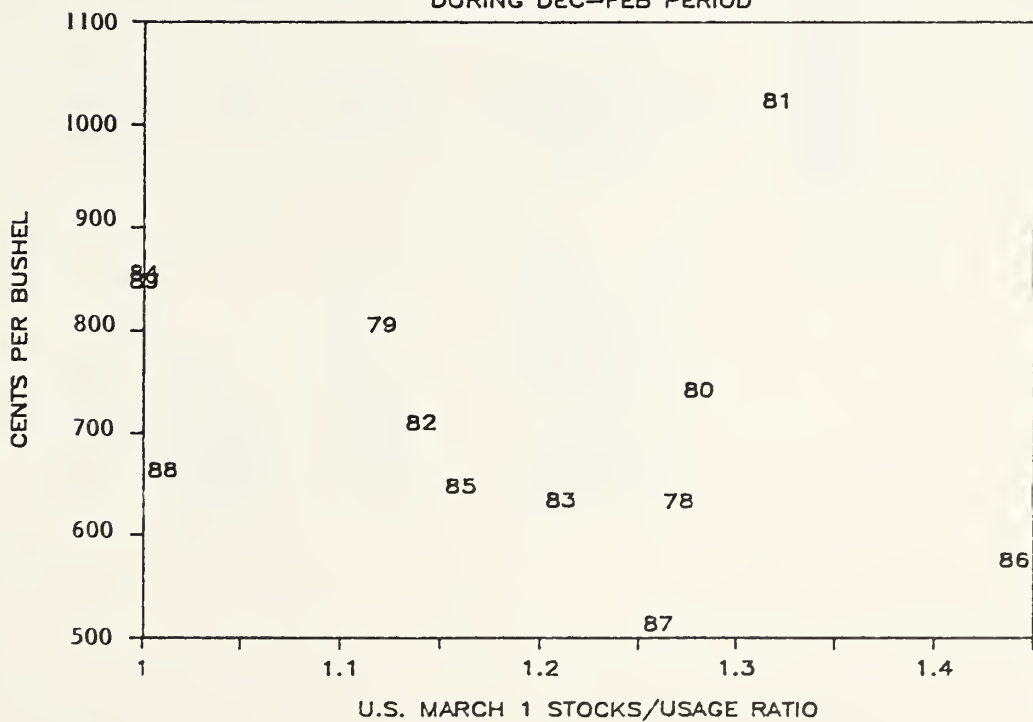


Table 1
U.S. SOYBEAN YEARLY SUPPLY/USAGE BALANCE
-September-August; million bushels-

	86-87	87-88	88-89	SLH 89-90	USDA 11/09 89-90	SLH 90-91
-thousand acres-						
ACRES PLANTED	60,385	57,955	58,870	60,475		58,000
% HARVESTED	0.965	0.983	0.975	0.977		0.980
ACRES HARVESTED	58,292	56,977	57,383	59,073		56,840
AVG. YLD bu/acre	33.3	33.7	27.0	32.8		33.5
CARRYIN	536	436	302	182	182	344
PRODUCTION	1,940	1,923	1,548	1,937	1,937	1,904
TOTAL SUPPLY	2,476	2,359	1,850	2,119	2,119	2,248
CRUSH	1,179	1,174	1,058	1,114	1,115	1,120
EXPORTS	756	802	527	575	575	575
SEED/FEED	57	56	59	60	59	58
RESIDUAL	48	25	25	25	35	25
TOTAL USAGE	2,040	2,057	1,668	1,774	1,784	1,778
CARRYOUT	436	302	182	344	335	470

U.S. MONTHLY SBO STOCKS

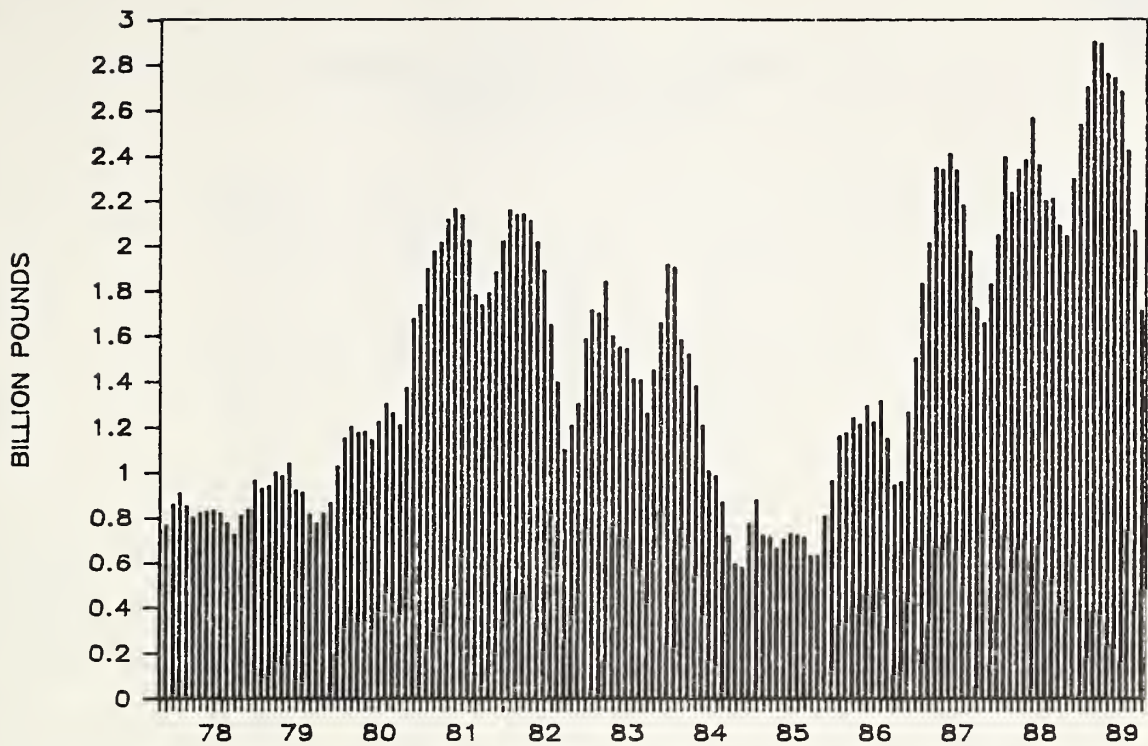


Table 2
SOYBEAN OIL SUPPLY/USAGE
-October-September-
-million pounds-

			SLH Proj. 89-90	USDA 11/09 89-90
	87-88	88-89		
BEG STKS	1,726	2,092	1,715	1,715
PRODUCTION	12,975	11,737	12,336	12,260
IMPORTS	196	125	0	15
TOTAL SUPPLY	14,897	13,954	14,051	13,990
DOMESTIC	10,931	10,578	11,100	11,000
EXPORTS	1,873	1,661	1,645	1,450
TOTAL USAGE	12,805	12,239	12,745	12,450
END STKS	2,092	1,715	1,306	1,540

Table 3
SOYBEAN MEAL SUPPLY/USAGE
-October-September-
-thousand tons-

			SLH Proj. 89-90	USDA 11/09 89-90
	87-88	88-89		
BEG STKS	240	154	173	173
PRODUCTION	28,083	24,943	26,592	26,450
TOTAL SUPPLY	28,323	25,096	26,765	26,623
DOMESTIC	21,291	19,793	21,200	21,273
EXPORTS	6,879	5,131	5,330	5,100
TOTAL USAGE	28,170	24,924	26,530	26,373
END STKS	154	173	236	250



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE
United States Department of Agriculture
Washington, D.C.

Outlook '90, Session # 13

For Release: Wednesday, November 29, 1989

GOVERNMENT PROGRAMS AND SOYBEAN ACREAGE: TIME FOR NEW THINKING

Dr. Kenneth Bader
Chief Executive Officer, American Soybean Association

Seventy years ago, a small group of farmers formed what would become the American Soybean Association with the idea of stimulating production and promoting the new crop for profit opportunities. Those farmers unified because they believed in the future of U.S. soybeans.

That future unfolded rapidly. The 1920s, '30s and '40s were decades of promoting production of the miracle bean. By the '50s and '60s the big question was what to do with that burgeoning production. The Association went to work again with support of the new USDA/FAS cooperation program with an international marketing effort that today supports 319 projects in 83 countries. By 1981, U.S. farmers exported as much as they had produced just fifteen years earlier.

Now we face new challenges. Challenges of a new decade ... and a new century. The challenge of increased competition from other soybean producers and other oilseeds. The challenge of changing consumer demands. The challenge of new and more stringent environmental regulations affecting our ability to produce.

Meeting these challenges requires new ideas and new directions. It means building a platform to meet the challenges and to capture opportunities.

We see this platform as a three-legged stool. U.S. soybean farmers must:

- 1) Expand markets through promotion;
- 2) Sponsor research to uncover new uses and to cut production costs, and
- 3) Create policies that permit farmers to benefit from market expansion.

All three legs must be in place or the stool will fall and U.S. farmers will fail against the challenges of the future.

All three are extremely important. But, being in Washington today, I want to focus on domestic policy. Many have said the 1985 Food Security Act is working ... if it ain't broke, don't fix it. While it may be working for many sectors of U.S. agriculture, it has not been working for soybeans, oats and some other crops. Rather than freeing farmers to make planting decisions based on market signals, our government programs have locked farmers into growing more of some program crops at the expense of other crops.

For the 1990s, we must find ways to provide a safety net for farmer income without perpetrating base lock and restricting farmer planting choices.

My father used to say that "hindsight makes good insight." So, before looking ahead, let's look back.

This has been one hell of a decade. Think back. The 1980s began with the Carter embargo against sales to the Soviet Union. The 1980s had burgeoning surplus crops ... the infamous Payment-in-Kind program ... increasing worldwide competition ... the conversion of Europe from being our largest soybean market to becoming our largest competitor ... a severe depression that resulted in thousands of farmers going out of business ... and, depending on where you live, three or four major droughts. Given the events of the 1980s, is it any wonder farmers look to the decade of the 1990s with relief mixed with a heavy dose of trepidation?

But, reviewing the 1980s must include looking at two major pieces of legislation ... the farm bills of 1981 and 1985.

For soybeans, the 1981 farm bill offered a soybean loan rate set at 75 percent of the national average price for the last five years discounting the high and low years. But the bill included a \$5.02 per bushel floor for the loan.

And, that floor became one of our worst enemies. It reached far beyond the farmers in Mississippi or Minnesota. It signaled to our worldwide competitors that they, too, were guaranteed a minimum of \$5.02 a bushel to grow soybeans. And, grow soybeans they did.

Four years later, Congress created a new farm bill amid a severe economic depression for U.S. farmers. And, it created what has been called base lock. To gain full benefits of program payments, farmers were forced to plant to the maximum of their base acres.

For example, the U.S. corn program encouraged farmers to build up their bases in good years and relied on target price income support over more and more acres in bad years. Southern farmers enrolled in farm programs began devoting less productive land to more risky soybeans. No wonder that in the decade of the eighties, U.S. farmers switched 12.6 million acres to program crops.

And, the 1985 farm bill continued the soybean loan floor that guaranteed the world's farmers no less than \$4.77 a bushel with provision of having it lowered to as much as \$4.50 a bushel over the life of the legislation. The

1985 farm bill also continued the long-standing policy that in times of surplus, the U.S. would store grain and soybeans. Thus, U.S. legislation established a debilitating policy that we stored while our competitors were free to sell.

The bottom line? Crops like soybeans, are being out-subsidized not just overseas but right here at home. Inflexible U.S. farm policies have discouraged soybean production in the U.S. while encouraging overseas oilseed production.

Look at the results. In the last seven years, U.S. farmers have cut soybean harvest by 10.3 million acres. Yet, in those same seven years, our competitors have increased soybean acreage 23.5 million acres. It doesn't make sense. We're exporting U.S. soybean production. We cut an acre; they increase over two acres.

What this means is in a growing world demand market, we lost both volume and market share. That cost U.S. farmers about two billion dollars in lost income -- an average of about \$4,500 for every U.S. soybean farmer.

This also raises serious questions for soybean customers including livestock and aquaculture, which consume soybean meal as well as edible soybean oil uses.

What's needed are solutions. The 1990 Farm Bill must address this serious problem ... or by 1999, we may well be in second place in soybean production. We'll be behind South America, and the U.S. poultry industry is sure to follow soybean production to South America. It doesn't have to happen! As I said before, hindsight makes good insight.

We've been out in the country for two years working with farmers ... getting their ideas ... identifying their problems ... seeking solutions. We held 34 listening sessions so farmers could outline their ideas, help establish policy guidelines and determine priorities. Then, in August, we held another 15 listening sessions among farmers to seek their guidance on possible program concepts. These sessions were held in all parts of the country with both members and non-members.

Farmers in overwhelming numbers say they want a change.

Their No. 1 priority is equity. Equal treatment for soybeans with program crops ... equal treatment among soybean growing regions. Equity in income potential means that market prices, not government payments or program bases, should dictate what farmers produce.

Farmers recognize that government can change domestic policies to correct the situation. U.S. soybean market share, product exports and profits will continue to shrink until we start talking about farmer income equity for soybeans.

That means income equity potential with corn, cotton, wheat and rice. It does not mean Congress should change those programs. After all, almost all soybean farmers also grow one or more of those crops, too.

So how do we get from here to there? In our 1990s policies meetings, farmers -- both members and non-members of ASA -- identified concepts that are practical and pragmatic.

Based on that input, ASA's voting delegates established in August the following ground rules for soybean policy. They said the 1990 Farm Bill should:

1. Provide no price floor to competitors of U.S. soybeans.
2. Avoid government-owned surplus stocks.
3. Keep soybeans free of set-asides.
4. Provide income protection for U.S. soybean farmers.
5. Allow equitable profit opportunities.
6. Provide planting freedom necessary for U.S. farmers to capture increasing world soybean demand and allows for a proper response to environmental and conservation concerns.
7. Oppose oilseed crops from being produced or harvested on set-aside acres.

ASA has not endorsed a specific program proposal yet. But, farmers through those 15 listening sessions in August have evaluated three concepts. And, after reviewing farmer attitudes, our leaders have asked ASA staff to analyze a new concept that came from the listening sessions.

Farmers have told us they want a program that will address the problem that soybeans are being outsubsidized at home and abroad. They want a program that will deal with the problems of base lock. A program that will seek to provide farmers the freedom to plant crops based on market prices. A program that will recognize that soybeans are directly impacted by market prices, target prices and acreage reduction requirements of corn and cotton. Such a program may well be based not just on those crops, but also on the level of proposed soybean stocks. Farmers may give up income protection on part of their soybean production to get a higher level of protection on the rest of production. And they would have the choice to give up the option of forfeiture of soybeans under the loan program. These are the program concepts. They address the equity question between soybeans and the program crops.

ASA will present Congress with a farmer-driven program. A program designed by farmers for farmers. A program that will provide reasonable income protection. A program that will give U.S. soybean farmers a chance to fight back ... a chance to compete equally ... and, a chance to get reasonable profit opportunities for their efforts. And perhaps most of all, our farmers want to put foreign producers at price risk.

Farmers began the 1980s with wide-eyed optimism. They leave the 1980s with trepidation, caution and relief. Yet, farmers are optimists. They believe in the future. They recognize that Congress through the 1990 farm bill can return their destiny to the marketplace.

Now, I want to switch briefly to the other two legs of the stool for farmer profits.

The second leg is trade policy. With success in our 301 unfair trade practices complaint against the European Community ... with improved GATT trade policies ... and with new U.S. policy that eliminates guaranteed income to our competitors, U.S. farmers can compete profitably in world markets ... can increase market share ... and can increase export volume.

The third leg of the stool is increasing markets through promotion and research. Given equitable domestic policies and increased access to world markets, U.S. farmers are willing to invest some of their income to support increased promotion and research.

As you know, ASA has encouraged the creation of a farmer-controlled nationwide Soybean Promotion, Research and Consumer Information program that we call SPARC. SPARC is designed to provide a fair, farmer-controlled promotion and research program that will help expand markets, find new uses for soybeans, expand and protect U.S. soybean markets and find ways to cut soybean production costs.

U.S. farmers have unbelievable opportunities. Growing worldwide markets like the Soviet Union and the PRC. Expanding new uses like environmentally safe soybean printing inks. But, our competitors seek those markets too. And, they're not waiting. Malaysian palm producers are investing the equivalent of 7.7 cents a bushel in research and promotion. Some Brazilian cooperatives are assessing their members two percent for promotion and research.

Our three-legged stool of market expansion through promotion and research ... domestic policies that treat soybeans equitably ... trade policies that improve market access are all designed to let U.S. farmers reap the benefits of their opportunities.

With all three legs in place, I believe we can and will compete.

In summary, working together creates solutions.

For soybean farmers, present U.S. farm policy inflexible policies, inequitable program benefits, lost exports and lost income. These policies have created fewer soybeans here, more overseas ... less U.S. soybean market share and volume ... and, reduced soybean income over \$2 billion.

It's time for a change!

ASA will present Congress with a farmer-driven policy program that will restore soybean equity with other crops and provide opportunities for market signals to work. Congress will have an excellent opportunity to favorably influence the profit opportunity of every U.S. soybean acre.

We enter a new decade amidst a unique confluence of challenges and opportunities. Growing markets and increasing competitors. This confluence may never be repeated. The 1990 farm bill will be the most important one ever for soybean farmers. Farmers want a change, and they're willing to commit themselves to competing if the proper policies are in place.

A D D I T I O N A L C O M M E N T S I N S E R T

GOVERNMENT PROGRAMS AND SOYBEAN ACREAGE: TIME FOR NEW THINKING

Dr. Kenneth Bader
Chief Executive Officer, American Soybean Association

And SPARC is not simply reaction: SPARC is action. It is preparedness. For instance, who would have thought just a year ago that we would see East Germans dancing on top of the Berlin Wall? That Poland would be led by a non communist coalition? That the Czeck people would force their entire government to resign?

The iron curtain has become a rusting relic. Will the sunshine of open trade, of profit opportunities for U.S. soybeans come shining through the cracks? Or will the window of opportunity already be filled by our competitors? It's up to us.

Eastern Europe and the Soviet Union need more meat, milk, fish and eggs. Leaders know that they MUST feed the people better if reforms are to survive.

U.S. farmers should help meet that need. But we've got two people covering East Germany, Poland, Czechoslovakia, Austria, Yugoslavia, Romania and Bulgaria and the Soviet Union.

To give you an idea of the size of the task, the territory they cover is five and a half times as big as the state of Minnesota -- WITHOUT the Soviet Union.

The information from the Soviet Union is not only news, it's history being made. And what are US soybean farmers doing about it?

I could tell you about our limited activities in the Soviet Union, Poland and East Germany. I could explain that, with government funding, we could get intensified U.S. soybean farmer representation in those countries. We could show them how to raise more livestock quicker and for less cost using soybeans.

If we had SPARC, we would be there, lending a hand, building markets and helping to feed the people -- today.

We can't afford to sit around waiting for opportunities to land in our lap.

In letters to President Bush, Secretary Yeutter and members of Congress, ASA has proposed a Soviet and Eastern European initiative. Our package includes:

Most Favored Nation trade status for the Soviet Union. MFN would reduce the tariffs on Soviet goods in the U.S. and give them incentive to buy American goods in turn.

- Emergency food and feed aid. This aid would include soybeans, soymeal and soy oil.
- A special SEE allocation for FAS to build long term trade by way of FAS/cooperator market development, trade servicing and other long term development programs.
- A government and private sector task force to explore the routes we can take to encourage the development of market economies in Eastern Europe.

SEE is a strong initiative designed to help us build while Eastern Europe rebuilds.

We can hope Uncle Sam comes through with the Soviet and Eastern European initiative. Meanwhile, one of the best arguments for passing the Soybean Promotion and Research Checkoff, or SPARC, is that if we had it now, soybean farmers could join in an aggressive partnership with our government to build markets while helping others build their economies.



American Soybean Association

November 29, 1989

The President
The White House
Washington, D.C. 20500

Dear Mr. President:

Recent events in Eastern Europe and the Soviet Union have been heralded around the world as an important step toward world peace. Attention is focused on the demand for democratic reform, yet the underlying needs for economic and political changes--including meeting the basic needs for food - must be met.

The situation presents a tremendous opportunity for the United States. Eastern Europe and the Soviet Union need more meat, milk, fish, and eggs. Their leaders need to feed the people better if reforms are to survive. To meet their goals, they will need protein for livestock and poultry, and vegetable oils for food uses. U.S. soybean farmers are ready and eager to help meet this compelling need.

The American Soybean Association, which represents soybean farmers in 30 states, requests your consideration of a four-part Soviet Union and Eastern Europe (SEE) initiative that would allow U.S. farmers to seize this opportunity:

1. Most Favored Nation trade status for the Soviet Union. MFN would reduce the tariffs on Soviet goods in the U.S. and give them incentive to buy American goods in turn.
2. Emergency food and feed aid. This aid needs to include soybeans, soymeal and soy oil.
3. Special allocation for USDA's Foreign Agricultural Service. A special allocation would enable FAS to build long-term trade with the Soviet Union and Eastern Europe by way of FAS/cooperator market development, trade servicing and other long-term development programs.
4. Special Task Force. A USDA and private sector task force should be established immediately to encourage the development of market economies in Eastern Europe.

Washington Office

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Soybean farmers believe this initiative is designed to help the United States agricultural community build while Eastern Europe rebuilds. We are eager to work with you in any way to see this happen.

Respectfully,

Marlyn Jorgensen
President

CC: Secretary Clayton Yeutter
Mr. Cooper Evans
House of Representative Agriculture Committee Members
Senate Agriculture Committee Members



Outlook'90, Session #14

For Release: Wednesday, November 29, 1989

OUTLOOK FOR CATTLE AND SHEEP

Steve Reed
Agricultural Economist
Economic Research Service

Beef production is expected to increase slightly in 1990, but still remain below production levels of 1983-1988. Larger fed steer and heifer slaughter in 1990 will offset expected declines in cow slaughter. Higher fed slaughter and further increases in slaughter weights should push 1990 beef production about 1 percent above 1989's level. However, this rise will not offset population and beef export increases. In addition, larger supplies of poultry plus a small increase in pork output will push total red meat and poultry consumption near 222 pounds on a per capita basis, the fourth consecutive year of record consumption. Consequently, retail Choice beef prices may rise only 1 to 2 percent in 1990, with similar increases in fed cattle prices.

Factors Affecting the Cattle and Sheep Industry

Economic Growth Continues to Slow

Growth in the general economy is expected to moderate further next year, although there appears to be little risk of an impending recession as the current expansion enters the eighth year. Consumer incomes should continue rising in real terms and high employment rates are expected to remain intact. Both these factors should provide continued support for meat prices. Risk of inflation rising above 4-5 percent seems unlikely in 1990. With near term inflationary pressures subsiding the Federal Reserve likely will allow easing of interest rates which are expected to remain steady to slightly lower to prevent the economy from slowing too much. The prime rate may fall slightly in 1990 after averaging near 11 percent in 1989.

Production Costs to Decline in 1989/90

Already lower feed costs and prospects for higher cattle receipts should improve producer net returns in 1990. Feed grain prices remain historically high but are averaging well below a year earlier and should maintain this year-over-year decline well into 1990. Sharply lower carry-over stocks from the 1988/89 marketing year, and higher feed use and exports in the coming months are expected to result in ending stocks next fall only modestly above current low levels.

Stocks of all feed grains at the end of the 1988/89 marketing year were down nearly 50 percent from the previous year, and are forecast to drop another 7 percent by the end of 1989/90. However, near normal production in the 1990/91 crop year would replenish inventories and pressure prices lower over the longer term.

The farm price of corn in October averaged \$2.20 per bushel, 38 cents below last year, but still well above the \$1.65 loan rate. Additional price changes will be modest through next spring when movement will depend on 1990/91 crop prospects. For 1989/90, corn prices are expected to average from \$2.00 to \$2.40 a bushel, remaining below this past year's \$2.54 average, but above the \$1.94 average in 1987/88.

Hay production, as of November 1, was forecast at 150.5 million tons, 19 percent above the 1988 harvest. The area harvested in 1989 declined 2.8 million acres from a year ago, but average yields rose 24 percent. As in 1988, long-term Conservation Reserve Acreage was made available for haying in drought areas this past summer. This additional acreage helped offset regional shortages, and pushed production of grass hay to record levels. Alfalfa hay production is expected to rise 15 percent from a year earlier, while production of other hay is up nearly 23 percent.

In spite of the higher production, low carry-over hay stocks have kept supplies relatively tight and prices near year-earlier levels. The average price received by farmers for all hay in October was \$85.70 per ton compared with \$86.80 last year. The farm price of alfalfa hay averaged \$92.20 in October, nearly unchanged from a year earlier. Other hay prices averaged \$64.30, down \$5.50 from last year. Additional price strength can be expected this winter in areas most affected by the drought and dependent on off-farm sources for additional purchases.

Continued poor pasture conditions in several of the Plains and Western States still could force additional culling from cow herds if winter weather conditions force additional feeding and supplemental hay must be purchased. Pasture and range feed conditions deteriorated somewhat in October, as parts of the Southern Plains and Southwest received little moisture in early fall. U.S. pasture conditions on November 1 were rated at 70 percent, 11 points above a year ago but 6 points below the 1978-87 average for the date. North Dakota and Texas were the only States remaining in the severe drought range. Minnesota, Nebraska, South Dakota, Utah and Wyoming were rated very poor.

Cattle

Net returns to cow/calf producers likely will average near \$40 per head this year and could reach \$45-\$50 per head in 1990. This would be the fifth straight year of positive returns, and should strengthen incentives to rebuild herds. Forage supplies in most areas have remained adequate in spite of regional droughts that have kept cattle numbers from expanding. These factors eventually should lead to larger cattle inventories and

higher beef production although it could be 1991 before larger calf crops translate into increased slaughter levels.

Inventory Expansion Begins

The U.S. cattle inventory on January 1, 1989 was about unchanged from the previous year, remaining below 100 million head. Little change in the inventory is expected this year. Heifers calving and entering breeding herds during the first half of the year fell 9 percent from a year earlier. On January 1, beef and dairy replacement heifers were up 5 and 2 percent, respectively. The 1988 calf crop rose 2 percent over the 1987 crop, but remains the smallest calf crop since the early 1960's. The July 1 inventory report estimated the 1989 calf crop to be slightly lower than a year earlier at 40.7 million head.

Beef and dairy replacement heifers on July 1 increased 4 and 2 percent, respectively from a year earlier. Many of these replacement heifers came from the 1988 calf crop and would not have been bred until this past summer. Thus, there remains some likelihood that herds could begin to expand in 1990, but they will not show up in breeding herd statistics until the midyear report is released next July.

The impact of last years drought and this year's poor hay quality appears to have had the greatest impact on the dairy sector where culling rates have been relatively high. Cumulative dairy cow slaughter through the end of October was running nearly 50,000 head above a year ago, with most of this increase coming during the first half of the year. Slaughter rates since June generally have remained below 1988 levels. Beef cow culling in 1989 also ran slightly above earlier expectations due to drought conditions in the Central Plains this past spring. Cumulative beef cow slaughter through the end of October was 3 percent below a year earlier. Total beef and dairy cow slaughter is expected to decline to 6.2 million head for the year, about 2 percent below 1988 levels.

Further decline in beef cow slaughter is expected in 1990 as well as some moderation in dairy cow culling rates due to recent advances in milk prices. Total commercial cow slaughter could drop below 6 million head next year, the lowest level since 1979.

Feeder Cattle Supplies Increase

Yearling stocker cattle prices continued trading in the low to mid \$80's per cwt. this fall despite weak to negative returns from cattle feeding. Strong demand for stocker cattle to go back to grass likely supported recent price levels, since feedlot losses have averaged near \$20 per head this year. Yearling feeder cattle supplies outside feedlots rose nearly 17 percent from a year earlier on October 1, while the inventory of lighter calves was about unchanged. Lower feedlot placements over the past two quarters and sharply lower calf slaughter both added to available feeder cattle supplies. The 1989 calf crop is expected to decline slightly from a year ago and could result in lower yearling supplies in 1990. Also increased heifer retention may restrict feeder cattle

supplies. Recent retention rates, however, have been modest compared to previous expansion years. This reflects lower returns per cow compared with the \$60 to \$120 returns above cash costs in 1978 to 1980.

Larger supplies of stocker-feeder cattle will be available as increased imports of steers from Mexico began in mid November. Imports this fall are likely to rise well above the 112,000 head imported last fall, possibly reaching near the 293,000 head imported in 1987. Forecasts for continued tight margins and seasonally higher feed costs likely will keep cattle feeders from bidding too aggressively for replacement cattle. However, if current dry conditions in wheat grazing country of the Central Plains persists similar to last year, there may be fewer cattle moving onto and remaining on wheat pasture this fall. This could result in a contra-seasonal decline in yearling prices this winter and generally would support higher placements on feed in late fall-early winter.

Larger Fed Cattle Marketings Expected

Fed cattle marketings in 1989 were 3 percent or nearly 750 thousand head below 1988 levels. Higher feeder cattle prices and dismal profit prospects have led to lower feedlot placements since last spring and in turn reduced fed cattle marketings. Cattle feeders have suffered through an extended string of losses, and current prospects do not look much better into the spring of 1990. Lower processing beef supplies during the second half of 1989 generally were supportive of cattle prices. But the lower processing beef supplies were partially offset by record heavy fed cattle weights and in some instances cattle weighting over 1300 pounds were discounted. Dressed slaughter weights may average 677 pounds in 1989, up nearly 10 pounds from last year.

Lower feedlot placements this past summer, and expectations that fall quarter placements may remain near a year earlier, should ensure a seasonal price rise into the spring quarter. Current inventories of heavy weight cattle may hold down near term prices. If heavy weights carry into the new year, they will weaken prospects for higher prices. But, beyond these numbers lies a drop in medium weight cattle inventories which will supply the bulk of marketings into February. Beyond the spring quarter, seasonally higher marketing rates likely will keep beef supplies above year-earlier levels and pressure prices into the lower \$70's per cwt during the second half of the year.

Additional declines in cow and bull slaughter are forecast for 1990, but will be offset by higher fed steer and heifer slaughter. U.S. feedlot marketings are expected to rise 1 to 2 percent in 1990, with the magnitude of the increase dependent on future price levels and profit prospects. Dressed slaughter weights will remain record large in 1990 as cattle continue to be placed on feed at heavy weights. Thus, beef production in 1990 may rise about 1 percent.

Price Increases to Slow in 1990

A favorable economic environment will be important over the coming year as total red meat and poultry consumption is expected to rise nearly 5 pounds per capita following little change in 1989. Beef production increases in 1990 offset population and export increases. Thus, per capita beef consumption is likely to decline, slightly, following a nearly 3 pound decline in 1989. All of the decline will be in nonfed processing beef.

Retail beef prices have set new records each year since 1987. Prices increased as the cattle herd liquidation ended and nonfed beef supplies declined. Consequently, beef consumption levels are dropping from the fairly static range of 76 to 79 pounds in 1979 through 1986 to an expected 68 pounds in 1990. Per capita fed beef supplies have remained fairly static throughout the decade of the '80's. With per capita beef supplies beginning to stabilize in 1990, the higher price of beef compared to competing meats could become a bigger issue in the coming months, particularly given the outlook for expanded poultry supplies at 10 to 15 percent lower prices. These large poultry supplies and continued large pork supplies could hold down beef price gains. After rising 5 percent in both 1988 and 1989, retail beef prices may rise only 1 to 2 percent in the coming year.

For 1990, fed steer prices at Omaha are expected to average \$71 to \$77, up from this year's \$72.50 and \$69.50 in 1988. Continued lower year-to-year grain prices, assuming normal weather patterns during the 1990 growing season, generally will support yearling stocker-feeder cattle prices about \$1 above this year's \$86. Prices for lighter grass type cattle are expected to range near this year's average price in the mid \$80's per cwt, and weaned calves could again bring prices near \$100 per cwt.

U.S. Cattle and Beef Trade

U.S. imports of live cattle are forecast to remain large at about 1.3 million head in 1989, down 2 percent from a year ago. Live cattle imports from Mexico through September were down 30 percent to 512,580 head, while imports from Canada over this period rose 21 percent to 421,489 head.

Mexico's export year for feeder steers runs from September-August. Last year the Mexican government abolished the Export Quota System and instituted a system which set an export tariff of 20 percent per head (minimum of US\$60) for exports up to 500,000 head. This tax has been reduced to 10 percent or \$30 per head. The export quota has also been increased to about 700,000 head. As a result, the flow of cattle from Mexico to the United States is likely to be quite heavy in the last quarter of this year and early 1990. The tariff is scheduled to be reduced in September 1990 to 5 percent and reduced again in September 1991 to 1.67 percent. In September 1992 the tariff is scheduled to be eliminated.

An extended dry period in Mexico this past summer reduced the carrying capacity of pastures and rangeland and increased the number of distressed marketings. Inventories are down this year and are expected to decline further because the official price for beef has been set low to help consumers and provides little incentive for producers to expand. This makes sales of feeder steers to the United States an even more attractive alternative.

U.S. imports of Canadian cattle have been unusually high this year. Most of the increase has been slaughter cows and heifers. In eastern Canada, dairy producers are liquidating herds to decrease manufacturing milk production, while dry weather in Western Canada, added to the cow disposal.

U.S. cattle imports are forecast to decline next year, mainly because of declines in imports from Canada. The new slaughter facility in Alberta should draw fed cattle that might otherwise have been exported to U.S. plants, and dairy herd liquidation also should slow.

U.S. Beef and Veal Exports to Rise

During January-August 1989, U.S. exports of beef and veal rose 58 percent to 767 million pounds, carcass weight. About 75 percent of the beef and veal was destined for Japanese markets. It has been reported that the Japanese have taken about two-thirds of the 344,000 metric tons agreed to under the quota in the first half of their fiscal year 1990. However, storage facilities in Japan, mainly for frozen beef, are strained. At present, a substantial amount of the meat sent from the United States is frozen. This contrasts with a larger share of the Australian beef which is fresh chilled. Some beef stockpiling in Japan likely occurred at the beginning of the year under the expectation of strong consumer demand. Retail beef prices do not yet reflect the lower prices for imported beef under the new system. Also, the infrastructure to handle the additional beef from both the United States and Australia must be developed, and there apparently is some difficulty developing outlets for frozen U.S. beef.

The United States as the major supplier of high quality fed beef has been able to increase its market share in the growing Japanese market. Although grass fed beef from Australia still is expected to provide the largest share of the beef exports to Pacific Rim countries, Australia is increasing feedlot capacity. Their fed cattle may be less high finish but it may eventually compete more directly with U.S. products.

U.S. beef and veal exports are forecast to increase 46 percent, reaching about 1 billion pounds carcass weight in 1989. Another 12 to 15 percent increase is likely in 1990. The Japanese have agreed to increase the beef quota next year by another 60,000 metric tons. The U.S. will have to share this market with the Australians which are expected to price their beef very competitively. Even with domestic output in Australia down this year because of herd rebuilding, exports to Japan increased. Australian

beef is forecast to increase in 1990 and a large share of this increase likely is destined for Japanese markets.

U.S. exports to Korea increased to 38 million pounds during the first nine months of 1989, up from 6 million pounds during the same period last year. On November 9, the South Korean government agreed to accept a ruling by the General Agreements on Tariffs and Trade (GATT) against beef import restrictions. Over the next 90 days negotiations will be conducted concerning the timetable for liberalizing the Korean beef market.

U.S. Beef and Veal Imports Decline

U.S. beef and veal imports declined 18 percent during January-August 1989 to 1,624 million pounds, carcass weight. Australian exports to the U.S. were down 38 percent due to higher prices and improved demand in domestic markets as well as from Japan and Korea.

Beef imports from New Zealand made up for some of the declines from Australia early in the year, but were only 5 percent over a year earlier through January-September. Dry weather through the end of May forced more cattle to slaughter, and about three-fourths of this beef was headed to export markets. Of this amount, fully three-fourths ended up in the United States. Exports are expected to decline during the remainder of 1989 and next year due to reduced available supplies.

Total beef imports for the year are forecast to decline 8 percent to 2,180 million pounds. In 1990 imports are forecast to increase from Australia but decline from New Zealand. As a result, total imports are likely to be about 2,140 million pounds.

Sheep and Lambs

Stock sheep returns have remained positive since 1983, and producers have responded by slowly rebuilding flocks. The number of replacement lambs on hand last January was up 4 percent from a year earlier, but many of these lambs may serve as replacements for older ewes being culled from breeding flocks. Dry weather this summer and fall in major sheep producing regions may have forced additional culling and dampened this build-up. Stock sheep slaughter through the end of October was running 19 percent above 1988 levels and exports of live sheep to Mexico were 207,000 head through August of this year compared with 67,000 last year.

Prices for sheep and lambs will average several dollars below a year ago as commercial lamb production rose a little over 1 percent above 1988 levels. Slaughter lamb prices have ranged from the low \$80's last spring to the low \$50's this fall and are expected to average in the mid-to upper-\$60's for the year.

For 1990, prices should again peak in the late winter early spring during the Easter-Passover holidays. However, beyond this peak demand period, seasonally higher slaughter rates during the summer and fall quarters

could result in prices once again trading in the lower \$60 range. Returns above cash costs to stock ewe operators declined this year to \$11 per head, compared with a \$20 return last year. Modest gains seem likely in 1990.

Lamb production next year should remain even with 1989 level. Production for the year is estimated at 330 million pounds. Production levels will depend on the stress placed on ewes in major production areas and the impact on lambing.

Feeder Lamb Imports

Imports of lambs and sheep during Jan-Aug 1989 reached 106,676 head, up from 24,775 head last year. Sheep imports traditionally have come mainly from Canada, however, 82,389 head were imported from New Zealand this year. Most of these animals were feeder lambs shipped into Portland, Oregon where they are put into quarantine for about a month then moved into feedlots for finishing.

U.S. Lamb and Mutton Imports

Total U.S. lamb and mutton imports were up 11 percent during the first 8 months of 1989. Fresh or frozen lamb imports jumped 17 percent to 25 million pounds, carcass weight. Lamb is supplied primarily by Australia and New Zealand with most of the mutton coming from Australia.

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OUTLOOK FOR HOGS

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Overview

In 1990, pork supplies may be slightly larger than in 1989. Commercial pork production could be below a year earlier in the spring and summer, but a substantial year-over-year increase is possible in the fall. Breeding inventories likely will expand as a result of rising net returns to hog producers.

The U.S. may import more pork, but fewer live hogs than in 1989. U.S. pork exports may show a small decline.

Barrow and gilt prices at the seven markets may average near \$45 per cwt for all of 1990, up from \$44 in 1989. Prices could be above a year earlier in the first half, but lower prices are likely in the fall. Retail pork prices may rise 4-5 cents per pound, averaging near \$1.86.

Demand Considerations

Major economic indicators may show relatively small changes in 1990. GNP growth, adjusted for inflation, is forecast near 3 percent, about the same as in 1989. The unemployment rate may hold steady at about 5 percent, while interest rates could decline slightly. Disposable income may grow at a slower rate than in the past two years, but hold above 6 percent.

Total meat supplies likely will increase in 1990. Poultry production could rise 7 percent, with broilers up 7 percent and turkey up 4 percent. Beef production could increase about 1 percent. Per capita consumption of red meat and poultry may reach a record 223 pounds in 1990, an increase of nearly 5 pounds from the previous year.

Larger supplies are expected to bring lower retail prices in the poultry sector. Retail prices of whole fryers and turkeys are projected to decline 8-12 and 4-

8 percent respectively. Retail beef prices could be about 1 percent higher on average, despite the slight increase in beef production. These price changes compare with an anticipated 2-percent rise in retail pork prices. Thus, retail pork prices could increase considerably in relation to poultry prices, and increase slightly in comparison to beef. This represents a sharp contrast to 1989, when pork prices declined while prices of other meats rose 3 to 8 percent.

As pork becomes more expensive in relation to competing meats in 1990, retail demand for pork likely will weaken. However, consumer perceptions usually change rather slowly, so any decline in demand may be gradual. Demand was strong at both wholesale and retail levels in the second half of 1989, and may continue relatively strong in the first part of 1990.

Breeding Inventories

The U.S. breeding herd increased from mid-1986 until mid-1988, but declined modestly during the 1988-89 crop year. The drought in the summer of 1988 reduced feedgrain supplies, and drove feed costs higher. Consequently, net returns to hog producers declined sharply. Net returns after cash expenses averaged below breakeven from fourth-quarter 1988 through second-quarter 1989. On September 1, 1989, the U.S. breeding herd was 3 percent smaller than a year earlier.

Net returns after cash expenses rose above breakeven in second-half 1989, and may remain positive throughout 1990. As a result of larger feed grain crops, production costs are declining. Higher hog prices have also contributed to the improvement in net returns, as fourth-quarter 1989 prices will average about \$8 per cwt above a year earlier. Prices may continue above year-earlier levels through at least the first half of 1990. The level of returns projected for 1990 is well below those of 1986 and 1987, but sharply higher than in the 1988-89 crop year.

The 3-percent decline in breeding inventories from September 1988 to September 1989 was small, considering the low net returns hog producers experienced during that period. Following the droughts in 1980 and 1983, producers' returns fell similarly, and the breeding herd dropped 8 and 9 percent, respectively. Despite last year's depressed returns, a significant portion of the industry either maintained or expanded inventories, apparently enabled by lower production costs and/or better capitalization. Liquidation may have been concentrated among smaller units which depend on their own corn crops for feed supplies. In any case, the modest inventory reduction during 1988-89 suggests that the financial condition of the industry is reasonably strong. It may also suggest that the industry is poised to resume the expansion that was underway prior to the 1988 drought.

The improvement in net returns may encourage hog producers to retain gilts for breeding. It is possible that breedings began to increase in late 1989. Some

expansion is likely in the heart of the corn belt, where last year's inventory cutback left excess capacity, and where feedgrain supplies have been replenished. However, continued development of new facilities is also expected. Corporate investment in hog production has grown over the last few years, increasing the number of large, farrow-to-finish operations. This segment of the industry may continue to expand as long-term plans are carried out. So, breeding inventories likely will trend higher over the next year, creating potential for larger pork production in fourth-quarter 1990 and beyond.

Pork Production

According to farrowing intentions reported in September, 1989, pork production in the first three quarters of 1990 may show only small changes from year-earlier levels. A modest increase is possible in the first quarter, and small declines may occur in the spring and summer. However, if producers increased breedings in late 1989, fourth-quarter 1990 pork production should be above a year earlier. Consequently, annual production could be up about 1 percent from 1989, and could reach 16 billion pounds for the first time since 1980.

The June-August 1989 pig crop should supply the bulk of first-quarter 1990 hog slaughter. The summer crop was estimated slightly larger than the previous year, suggesting a 2-percent increase in first-quarter slaughter. However, slaughter during January-March could be reduced if gilts from the summer pig crop are held back for breeding.

The number of pigs farrowed between September 1989 and February 1990 may be about the same as a year earlier, if producers follow through with reported intentions. Most of these pigs will reach market weight during the second and third quarters of 1990. Still, second-quarter hog slaughter could fall about 2 percent below a year earlier. Slaughter in second-quarter 1989 was unusually high relative to the preceding fall's pig crop, and a more typical relationship is anticipated next spring. For the same reason, third-quarter hog slaughter may be slightly less than a year earlier.

Hog slaughter in the fall of 1990 will largely be determined by the number of sows and gilts bred in November 1989 through February 1990. With producers' net returns trending higher, breedings during this period likely will be up from a year earlier. Accordingly, hog slaughter is expected to increase next fall. The extent of the increase will depend on how aggressively producers expand breeding herds. A 2-percent increase in the March-May 1990 pig crop could raise fourth-quarter pork production by as much as 5 percent, since production this fall has been light in relation to last spring's pig crop. Thus, potential exists for a substantial increase in pork production by the end of 1990.

Foreign Trade

U.S. pork imports have declined in each of the past 2 years, but an increase is possible in 1990. Larger imports are expected from the European Community, where larger supplies and lower prices are likely next year. EC pork production is expected to increase in response to high pork prices during 1989. Imports from Eastern Europe may decrease as those countries adjust to economic and political reform, and focus on maintaining domestic meat supplies.

Imports of hogs and pork products from Canada will be affected by countervailing duties imposed by the U.S. International Trade Commission. The duty on live hog imports likely will be raised next year. U.S. imports of live hogs are expected to decline as a result. But a reduction in live hog imports may tend to reduce Canadian pork prices relative to U.S. prices, thereby encouraging imports of pork products. Also, in first-half 1989, product imports were reduced (and live hog imports increased) by labor strikes against Canadian packing plants. These labor disputes were largely resolved by midyear. Thus, pork imports from Canada may be slightly larger than in 1989, despite the establishment of a duty on imports of fresh, chilled, and frozen pork last May.

U.S. pork exports rose about 23 percent in 1989, as shipments to both Japan and Mexico increased. In 1990, U.S. exports may remain relatively strong, but below the 1989 total. Exports to Japan may be about the same as in 1989. Total Japanese pork imports could increase, but Denmark and Taiwan likely will supply the additional Japanese demand. Pork production in both Denmark and Taiwan are expected to rise in 1990. Consequently, the U.S. share of the Japanese pork market may decline. U.S. exports to Mexico could decrease in 1990, partly because of a 20-percent tariff on U.S. hogs and pork products imposed in July 1989. Also, there is some question whether Mexico's foreign exchange reserves will be sufficient to maintain pork imports at their current pace.

Hog and Pork Prices

Barrow and gilt prices may average above a year earlier in the first half of 1990, but likely will face increasing pressure from expanding hog supplies and competition from other meats as the year progresses. By mid-fall, prices are expected to drop below 1989 levels. For all of 1990, prices at the seven markets may average near \$45 per cwt, slightly higher than in 1989.

Demand for pork at the wholesale level strengthened considerably in the second half of 1989. Some of the strength stemmed from an increase in pork shipments to Japan, and from anticipation of government purchases of pork bellies for donation to Poland. However, retail pork features also increased considerably, evidenced by a reduction in wholesale-to-retail price spreads. Retail features likely were motivated by large supplies and low prices of pork relative to other meats. In late spring, wholesale fresh pork prices fell to 10-year lows relative to beef, and reached record lows relative to broiler prices.

Wholesale pork demand may remain stronger than a year earlier in the first quarter, keeping barrow and gilt prices above year-earlier levels. At the seven markets, prices may average in the mid \$40's per cwt. Demand likely will weaken as wholesale and retail pork prices increase relative to other meats, but weakness is expected to develop gradually.

Barrow and gilt prices could average in the mid \$40's per cwt in the second quarter, and in the mid-to-high \$40's in the summer quarter. Prices could be supported by a modest reduction in pork supplies, especially in the spring. In the summer, seasonal strength in hog prices could be limited by larger beef supplies. Commercial beef production in third-quarter 1990 may be 4 percent above a year earlier. It is also possible that hog slaughter will rise above year-earlier levels before the end of the third quarter, if hog producers began to expand breedings before November 1989.

Likely, breeding herd expansion will cause hog slaughter to rise in fourth-quarter 1990. Thus, potential exists for a sharp seasonal decline in hog prices. The fourth-quarter average price at the seven markets could fall to the low \$40's per cwt. More extreme price weakness is possible in the fourth quarter, if expansion is aggressive.

One factor expected to lend support to hog prices in 1990 is a further reduction in the spread between hog prices and (wholesale) carcass cutout values. This spread contracted in 1989, as competition among pork packers increased. Slaughter capacity appears to be expanding, through remodeling (including re-opening of plants which were previously idle) and construction of new facilities. Much of the expansion is occurring within a small geographical area of the Corn Belt. Competition among packers could increase further in 1990.

Retail pork prices could average near \$1.85 per pound in the first half of 1990, steady with second-half 1989, but about 5 cents per pound higher than a year earlier. Retail prices may remain above a year earlier, supported by higher wholesale prices, until the fourth quarter. For all of 1990, prices may average \$1.85-1.87 per pound, 3-5 cents higher than in 1989. Wholesale-to-retail price spreads declined substantially in second-half 1989, and may remain below a year earlier in the first half of 1990. However, spreads likely will trend higher as the year progresses.

Summary

The long-term trend in hog inventories and pork production points upward. Expansion of breeding herds may occur in response to higher net returns to hog producers, leading to an upturn in pork production toward the end of 1990. Pork supplies could be larger in 1990, due to slight increases in production and imports, and a slight decline in exports. Hog prices could be higher in the first half of the year, but lower prices are likely in the fourth quarter.

Retail pork prices may increase, and both wholesale and retail prices likely will rise relative to prices of other meats.

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OUTLOOK FOR POULTRY AND EGGS

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The broiler and turkey sectors experienced explosive growth in production and returns during the 1980's. Growing incomes enabled consumers to purchase increasing amounts of broiler and turkey meat marketed in new, convenient forms through numerous outlets. In contrast, the egg sector experienced declining production and returns as consumers reduced egg consumption for a variety of reasons, including changing eating patterns and habits, and concerns over cholesterol. All sectors experienced challenges associated with fluctuating grain and soybean meal prices and consumer concerns about the quality of poultry products. The poultry and egg industry is poised to face the challenges of the 1990's from the expanded scientific, technological and financial bases developed.

Broiler production is forecast to continue growing in 1990, building upon expectations of an extension of the several years of positive net returns experienced by the industry. Turkey production is also expected to continue growing, but more slowly than in 1989. Egg production is expected to increase, as producers respond to strong net returns associated with the low level of production in 1989. Prices of broilers, turkeys, and eggs are all expected to be lower in 1990 because of larger supplies.

Factors Affecting Supply and Demand

Macroeconomic Environment

The overall economic environment for 1990 likely will be favorable to poultry and egg producers, although less robust than in recent years. The general economy will likely grow modestly, while interest rates decline slightly and

GNP price deflator, is expected to average between 4 and 4.5 percent in 1989, but drop slightly in 1990. The prime rate is expected to be around 10 percent for 1990. Real per capita income may rise nearly 3 percent in 1989, and grow at around 2 percent in 1990.

Production Costs Lower

Production costs for poultry and egg producers are expected to be lower in 1990 as a result of increased corn and soybean production due to improved growing conditions. Corn production in 1989/90 is estimated at 7.59 billion bushels compared with only 4.92 billion bushels in 1988/89. The average farm price is expected to average \$2.00 to \$2.40 per bushel in 1989/90 compared with \$2.54 in 1988/89. Soybean production is estimated at 1.94 billion bushels in 1989/90, up 389 million bushels from 1988/89. Soybean meal prices are expected to average \$150-\$180 per ton in 1989/90 compared with \$233 in 1988/89.

Total Meat Supplies Larger

Total red meat and poultry production is expected to set a record in 1990, as it is expected to do in 1989. Beef production will likely increase in 1990 because of more fed beef. Pork is expected to show only slight growth in 1990, and broiler and turkey production will continue to grow. Expected per capita disappearance of red meat and poultry in 1990, at around 223 pounds (retail basis), will increase over 4 pounds, or two percent. This increase will come from poultry, as per capita red meat disappearance may be down fractionally. With larger red meat and poultry production and weaker growth in per capita income, market prices for poultry could be pressured lower in 1990.

Broilers Outlook

Production Expansion to Continue

Broiler production is expected to increase about 7 percent in 1990, encouraged by strong net returns in 1989 and expectations of continued positive returns in 1990. This growth follows an estimated 7 percent increase in 1989 and will extend the long-run expansion of the 1980's. Total federally inspected broiler production will likely increase 64 percent from 1980 through 1990, from 11.3 billion pounds to around 18.5 billion pounds. During 1980-1989, per capita consumption increased from 42 pounds in 1980 to around 65 pounds in 1989. Consumption in 1990 will likely increase another 5 pounds per capita.

One indicator of planned broiler expansion is the size of the hatching egg laying flock, an indicator of the short-run capacity to produce broiler chicks. The flock was up 6 percent on November 1 compared with a year earlier, suggesting intentions to expand broiler production in early 1990. Cumulative broiler pullet placements in the broiler hatchery supply flock also indicate continued

production growth in 1990. Production increases are expected to be greatest in the first half of 1990, with first-and second-quarter production estimates up over 8 and over 7 percent, respectively. Production increases in the second half will likely slow to slightly under 7 percent, as prices weaken.

Broiler Prices to Decline

The expected 7 percent increase in production next year is expected to push prices lower, but a continued favorable demand environment may be partially offsetting. The average 12-city wholesale price for 1990 is expected to be in the 49-55 cents per pound range, down from 59-60 cents in 1989. First quarter prices may average 48-54 cents per pound. Prices are anticipated to strengthen seasonally in the second and third quarter before dropping in the fourth quarter.

The 12-city wholesale broiler price will likely average 50-52 cents per pound in the fourth quarter 1989, compared with 58 cents a year earlier. Average broiler prices for the first and second quarters of 1989 were up about 30 and 20 percent, respectively, compared with a year earlier. Prices fell below year earlier levels in the second half, due to increasing total supplies of meat, mainly poultry. Prices were also influenced by seasonal factors such as the end of summer cookouts and vacations.

Retail prices in 1990 are expected to be lower, and average in the mid-to-low 80 cents per pound range. The average retail price for whole fresh fryers was strong in the first half of 1989, and for the year will likely average 92 cents per pound, 7 cents above last year.

Positive Net Returns to Continue

The latter half of the 1980's has been one of both expansion and positive returns to broiler producers. This contrasts sharply with the 1980-1983 period when it was estimated there were only two quarters of positive returns, primarily because of high feed costs. According to USDA estimates, the average net returns, on a whole bird, ready-to-cook basis, have been positive for all quarters except one since the first quarter of 1984. Some of the earnings of the late 1980's have been reinvested in the remodeling of existing facilities and the construction of broiler production complexes in new areas, which creates the potential for future industry growth.

Net returns to broiler production are expected to remain positive through 1990 but below 1989 levels as broiler prices will likely be lower. Anticipated lower corn and soybean meal prices in 1990 will partially offset anticipated wholesale broiler price declines. The cost of production in 1989 will average around 50 cents per pound on a ready-to-cook basis, and may drop to the mid-40's in 1990.

Relatively high broiler prices during much of the year combined with lower feed prices resulted in positive average net returns during 1989. Prices of corn and soybean meal, key broiler ration ingredients, declined through much of 1989 in contrast to the drought-induced price increases of 1988.

World Production Increasing

Broiler production world-wide is expected to increase around 5 percent in 1990 following nearly a 3 percent rise in 1989. The largest producers, which produce about 75 percent of the world production, are the United States, the European Community (EC), Brazil, the Soviet Union and Japan.

U.S. Exports Increase

U.S. broiler exports are expected to remain strong in 1990, at over 900 million pounds, or almost 5 percent of total production. This would follow record exports in 1989 which will likely increase 22 percent over 1988, to nearly 940 million pounds. Expected lower domestic broiler prices will help the U.S. competitive position in world broiler trade. Improved access is expected to continue in countries such as Japan, Mexico and Canada. If additional sales to the USSR materialize and Mexico continues its policy of increased imports, U.S. broiler exports could reach new highs in 1990.

Exports in 1990 will build on the 1989 expansion, which has been spurred by the relatively low prices for dark meat parts. Most exports are expected to be commercial sales, as in 1989 when most exports were commercial sales rather than through government programs, such as the Export Enhancement Program (EEP). Broiler parts represented 96 percent of the exports. Six major buyers, Japan, Hong Kong, Mexico, Canada, Singapore and Jamaica took 86 percent of the broiler exports.

Turkey Outlook

Turkey Production to Increase

Turkey production for all of 1990 is expected to increase 4-5 percent, following an expected 6 percent increase in 1989. Turkey production nearly doubled in the 1980's, increasing from around 2.4 billion pounds in 1980 to an estimated 4.4 billion pounds in 1990. Per capita consumption has increased from 10.5 pounds in 1980 to a likely 16.7 pounds in 1989. It may rise to over 17 pounds in 1990. Influencing the increase in consumption has been the availability of turkey in many cut-up and further processed forms. As a result, growth in turkey consumption has occurred throughout the year and not only during the traditional holiday seasons in the fourth quarter.

Turkey production for first-quarter 1990 is estimated to exceed that of a year earlier by 12 percent, similar to the rate of increase in the fourth quarter of 1989. Turkey poult placements in October were up 20 percent compared with a year earlier. However, if net returns are low or negative in late 1989, increases in future placements will likely slow. Second quarter 1990 production may grow by about 8 percent. Production in the second half of 1990 is expected to be at about the same level as in 1989.

Turkey Prices to Weaken

Turkey prices are expected to weaken in 1990, reflecting the increases in production and availability of other meats. Eastern region wholesale hen turkey prices are expected to average 55-61 cents a pound during first-quarter 1990, down from 62 cents a year earlier. Prices will continue to ease through the second quarter, but increase to 1989 levels in the second half as production growth slows. Prices for the year will likely average 57-63 cents per pound, compared with 64-65 cents in 1989.

Wholesale turkey prices were generally higher in the first half of 1989 compared with the year earlier, but fell below 1988 levels in the third quarter, reflecting large increases in production. Eastern Region wholesale hen turkey prices began to rise in the early part of the fourth quarter in response to buying for the holiday season, to above 70 cents by mid-November. Prices may to weaken before the end of 1989 as the seasonal buying recedes, and average in the mid-60 cents per pound during the fourth quarter, compared with 72 cents a year ago. A higher average price is expected for 1989 overall, 64-65 cents per pound compared with 61 cents in 1988.

Increased Per Capita Consumption To Continue

Per capita disappearance of turkey is estimated to increase slightly to over 17 pounds in 1990, continuing the growth of previous years. Heavy holiday featuring could result in record consumption in 1989 of about 16.7 pounds per capita.

Because of large turkey and other meat supplies, retail turkey prices are expected to ease in 1990, following the pattern of wholesale prices. Retail prices for whole turkeys are expected to average about 99 cents per pound in 1989, slightly above 1988. Average fourth-quarter 1989 prices are expected to be around 5 cents per pound lower than in 1988.

Net Returns Average Slightly Below Break-Even

Average net returns for turkey producers are expected to be near breakeven in the fourth quarter of 1989 and slightly negative for 1989, making it the third consecutive year that estimated net returns averaged slightly below breakeven. Returns are expected to be negative in the first half of 1990, but turn positive

in the second half as wholesale prices increase. Production costs will likely average about 5 cents per pound lower due to expected lower feed costs.

Returns to turkey production in the 1980's were much more volatile than broilers. The longest period of consecutive positive returns was from the second quarter of 1984 through the second quarter of 1987. In 1988 and 1989, net returns are about equally split between quarters of positive and negative returns.

World Production Increasing

World production of turkey is expected to rise approximately 4 percent in 1990, about the same rate of increase as in 1989. The United States is expected to remain the leading turkey producer in 1990, producing over 55 percent of world production. Other leading producers include the European Community, the USSR, and Canada.

Turkey Exports to Increase

Turkey exports during 1990 are expected to increase by about 10 percent, to approximately 48 million pounds. This represents about one percent of total U.S. turkey production. The turkey meat classification issue with Germany is being resolved, enabling U.S. exporters to meet a stricter definition of seasoned turkey, and thus resume exports to this major market. Lower U.S. turkey prices would also enhance competitiveness.

Turkey exports for 1989 are expected to be down about 15 percent from 1988, to around 44 million pounds. Parts make up about 82 percent. Higher U.S. prices in 1989 combined with trade restraints in major markets such as Germany and Egypt. Exports increased markedly to Canada, because of slow growth in Canadian production and an increased import quota under the U.S.-Canadian Free Trade Agreement, and to Mexico, due to reduced production and the Mexican government's policy to maintain consumption with increased imports.

Egg Outlook

Egg Production To Increase in 1990

Total egg production is expected to rise about 2 percent in 1990, in contrast to a 3 percent decline in 1989. The egg industry approaches 1990 from the perspective of many years of flat to declining production. Total egg production declined from 5.8 billion dozen in 1980 to an estimated 5.6 billion dozen in 1989. Production for 1990 is estimated at 5.7 billion dozen, nearly 2 percent lower than in 1980. Changing eating habits and patterns by consumers combined with public concern over cholesterol and salmonella contributed to per capita consumption of table eggs declining from 271 eggs in 1980 to an estimated 235

eggs in 1989 and in 1990. Without population growth, total egg consumption would have dropped more during the 1980's.

Table egg production is likely to increase nearly 2 percent to about 5 billion dozen in 1990. Table-egg production increases reflect flock expansion encouraged by strong net returns in 1989. Increases in both egg-type eggs in incubators and egg-type chicks hatched indicate that the total flock size will be increasing. Most of the expansion will likely be realized in the second half of 1990, when egg production may be 2-3 percent greater than in 1989. Production in the first half is expected to be about 1 percent larger in 1989. Hatching egg production is anticipated to increase by around 3-4 percent.

Table egg production declined 4 percent in 1989, reflecting producer adjustments to heavy losses incurred through most of 1987 and 1988. Table egg production during the fourth quarter 1989 will likely be 2-3 percent below a year earlier. The table-egg-type laying flock on November 1 was down about 3 percent. While net returns in 1989 have been the best in years, producers appear to be remembering the heavy losses experienced in 1987 and 1988 and flock expansion is not occurring as rapidly as might otherwise be expected. It is likely that some earnings are going to debt repayment, thus contributing to a more solid basis for future production.

Prices to be Lower in 1990

Lower wholesale egg prices are expected in 1990 as supplies increase, averaging around 66-72 cents per dozen compared with an estimated 79-81 cents in 1989. Wholesale egg prices have been strong throughout 1989, reflecting lower production. Fourth quarter 1989 prices are likely to be about 20 cents per dozen higher than in 1988. First-quarter 1990 prices likely will average around 76-80 cents per dozen, but could decline to the mid-to-low 60's in the second half as additional eggs come to market.

Consumption Steady

Per capita consumption of eggs in 1990 is likely to be around 235 eggs, unchanged from 1989. Consumption at this level would be at least a momentary pause in the long-term downward trend in per capita egg consumption. Retail egg prices are up sharply in 1989, to an average of around 97 cents per dozen compared to 79 cents in 1988. With increased production, retail prices are expected to follow the trend of the wholesale market and decline in 1990. Prices could average in the mid-80's for the year.

Net Returns to Continue Positive

Egg producers can expect positive net returns through at least the first half of 1990, although at lower levels than in 1989. Returns in 1990 are expected

to be strongest during the first quarter and to decline through the rest of the year as supplies increase.

The level of returns, particularly in the second half, will depend greatly upon how much production increases. High egg prices and declining feed costs combined in 1989 to provide egg producers the longest sustained period of positive net returns in over 10 years. Average net returns for 1989 are estimated at about 15-19 cents per dozen during the fourth quarter and slightly lower for the year. It is unusual, given the normal cyclical nature of egg prices, for average net returns to be positive for all quarters of a year. The last time it occurred was in 1976. The string of positive net returns in 1989 reflects the sharply reduced level of table egg production and resulting higher prices, and somewhat lower feed costs in the second half.

World Production to Increase

World egg production may increase slightly over 2 percent in 1990, about the same rate of growth as in the United States. The world's largest egg producing country is China, which will likely increase its production by 4 percent. The Soviet Union, the second largest egg producer, will likely boost production by 2 percent in 1990. The EC, United States, and Japan are expected to round out the top five largest egg producing areas in 1990.

Exports to Increase

U.S. egg exports in 1990 are expected to be up 4-5 percent, at slightly over 100 million dozen. This recovery follows a decline in 1989, when total egg exports may be down 30 percent. Egg exports will likely increase in 1990 with expectations of lower U.S. egg prices. The U.S. competitive position versus the EC is expected to improve. The levels of sales to Mexico and exports under the EEP will be important factors influencing the 1990 export level. Japan is expected to continue as the largest U.S. customer in 1990.

About 1-2 percent of total U. S. production is exported. Exports under EEP and export credit guarantee programs were down in 1989, and relatively high U.S. egg prices generally restrained exports. Exports declined to a number of leading markets, including Japan, Hong Kong, and Iraq, but increased to Canada, Mexico and to the Caribbean countries. Egg products made up 55 percent, hatching eggs 26 percent and table eggs 19 percent of total egg exports in 1989.

Egg Imports to Decrease

Egg imports are likely to decline in 1990 as lower relative prices of U.S. eggs make them more attractive for breaking use by U.S. egg processing companies. Imports for 1989 overall could total about 28 million dozen, the highest level

since 1984. Over 90 percent of 1989 imports were shell eggs for breaking as higher U.S. prices influenced breakers to buy more imported eggs.

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OUTLOOK FOR VEGETABLES

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Overview

Vegetable Output and Prices Strong in 1989

U.S. vegetable production for 1989 likely will top the drought-reduced level of 1988, largely due to a 29-percent increase in processing tonnage and a 3-percent gain in potato output (table 1). Processing vegetable output is estimated at nearly 15 million tons, while potato output is estimated at 367 million cwt. Output of fresh vegetables, mushrooms, sweetpotatoes, and dry edible beans are expected to rise 1, 14, 7, and 25 percent, respectively.

Despite the strong increase in U.S. vegetable output, the value of all U.S. vegetable imports likely will rise by about 5 percent to a record level. Growth in imports during 1989 stemmed from strong prices at the wholesale and retail levels, combined with continued strong consumer demand. Most of the imports are fresh vegetables, which enter the United States during the winter months when U.S. production is limited to the southern-tier States.

Even though U.S. vegetable prices were strong in 1989, foreign demand increased and likely will boost export value nearly one-tenth from the \$1.4 billion of a year earlier. This level is near the record high of 1981, though successive declines in the following years resulted from severe underreporting at the U.S.-Canadian border, which receives the bulk of U.S. fresh exports.

Vegetable Use Grew in 1980's; More Expected in 1990's

Domestic per capita use of total vegetables rose to an estimated 336 pounds in 1988 from 335 the previous year, despite drought-reduced supplies (table 2). In general, increases in fresh vegetables, potatoes, and mushrooms offset declines in the processing sector.

Fresh vegetable use reached 100 pounds per capita for the first time because of higher lettuce and onion use. Increased supply from U.S. production and imports of lettuce completely offset higher exports. Lettuce use grew as demand expanded for such value-added products as shredded and prepackaged lettuce. Onion use rose as 1988 output set a new record of 48 million cwt, with much of the additional supply going to the foodservice market.

Recent results from the Fresh Trends '89 survey (conducted by Vance Research Service) indicate that consumers are concerned about health and nutrition and highly correlate good health and nutrition with eating fresh vegetables. The respondents indicated that they were eating more fresh vegetables at the expense of canned and frozen vegetables. They tended to eat fresh vegetables over processed because of better quality of vegetables are now available, more kinds of vegetables are available, and items can be microwaved. These results indicate that fresh vegetable consumption will likely continue to outpace process consumption in the 1990's, unless consumer's confidence about the safety of the fresh supply is shaken.

Potato use rose from 49 pounds in 1987 to 55 pounds in 1988. This gain can be attributed entirely to large carryover stocks of fresh potatoes. Use of frozen potatoes dropped 4 percent to 44 pounds as record exports reduced the domestic supply.

What is Ahead for the Vegetable Industry in the 1990's

Vegetable growers have benefited during the 1980's from increasing output and strong demand, yet the 1990's are likely to pose a challenge to growers. The major issues are food safety, farm labor, chemical availability, and water quality. Each of these issues could have a negative impact on the supply of vegetables which would increase the cost to consumers. Already, research in these areas portends a brighter outlook for the quality of vegetables reaching the market in the 1990's.

The issue of food safety has come to light more for fresh vegetables than processed and has shaken consumer confidence about fresh vegetables. One apparent difference between fresh and processed vegetables is the existence of strict food labeling laws for the processing sector. As such, the fresh vegetable industry has been busy introducing its own labels like Organic, Low-input, IPM, and Natural. This recent proliferation of labels has placed an overwhelming amount of information in front of the consumer. Producers and retailers are trying to tell consumers what quality is and in fact only further clouding the issue.

Consumers want to know more about the fresh vegetables they purchase and a recent survey indicates that they are likely to pay more money for products which are clearly and simply identified. Consumers probably would be receptive to a choice in available vegetables, whether it be pesticide-free or simply pesticide-residue free.

Current legislation is at both the Federal and State level to enhance the quality of the food supply. Several of the important pieces of legislation are:

- The Food Safety Amendment of 1989 would replace EPA's current method of assessing both risks and benefits of a pesticide with a risk-based standard.
- The Comprehensive Food Safety Inspection Act of 1989 would consolidate food inspection functions under USDA.
- A new California Department of Food and Agriculture program, scheduled to go into effect January 1, 1990, would require growers to report all pesticides used on crops, rather than just the 50-60 chemicals whose use is restricted in California.
- A California voter initiative on pesticides for the 1990 ballot. This is a sweeping initiative, which among other goals contains language to phase out many "suspect" pesticides and revise (lower) pesticide standards to "protect children's health."

As food safety issues have dominated the public's attention during the last few years of the 1980's, farm labor availability likely will dominate grower's attention during the 1990's. The enactment of the Immigration Reform and Control Act of 1986 and recent passage of the higher Federal minimum wage rate legislation is forcing growers, especially those with seasonal labor, to review their farm labor policies.

Fresh vegetable production is more dependent on seasonal farm labor than processing vegetables, potatoes, and dry edible beans. Thus fresh vegetable producers would likely feel the greatest impact from either higher wage rates or higher costs associated with maintaining the labor supply.

Already many fresh vegetable growers sense that they are going to face some type of labor shortage as newly legalized workers are enticed off the farm. Illegal or undocumented seasonal workers may not be as readily available with labor shortages in Mexico reducing the flow of these workers into the United States. U.S. vegetable growers are employing labor incentives such as charging nominal rates for housing, providing health-care benefits, and offering free day-care for employees' children.

In 1988, EPA revised the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) in order to speed up the review of older chemicals at the chemical manufacturer's expense. Because vegetables are considered "minor use" crops by the chemical companies, previously registered herbicides, fungicides, and insecticides may be dropped. The list of chemicals already dropped by companies is growing, indicating the trend to come.

Vegetable growers will be faced with tough choices in the 1990's regarding their cultural practices. Research efforts have recently focused on the use of alternative production methods. Alternative production practices includes integrated pest management (IPM), low input sustainable agriculture (LISA), or organic production methods.

Legislation is in place, re-registration of pesticides by the Environmental Protection Agency, to reduce the number and amount of chemicals which are used on vegetables. However, policy

oriented towards research in the area of low input agriculture has been a bit slower in the offing.

Environmental concerns have also focused attention on the quality of irrigation run-off water as it impacts aquatic animal and vegetative life. Vegetable growers are by far the heaviest users of irrigation, along with fruit growers, and will be forced to address the issue of how to dispose of waste water in the 1990's. Short-term solutions have been to install on farm evaporation ponds. However, as growers change cultural practices because of less chemicals used, some improvement will obviously be transferred to the quality of waste water.

Vegetable Trade Deficit Likely to Narrow in 1990's

The value of all vegetable imports during the 1980's rose nearly 8 percent per year, while exports rose 2 percent per year. Deterioration in the reporting of exports to Canada has shadowed much of the growth in U.S. fresh vegetable exports which are shipped primarily to Canada. The value of Canadian vegetable imports, however, rose 6 percent per year between 1983 and 1988 and was, on average, double the value of U.S. vegetable exports. Changes in reporting of exports is expected to correct much of the discrepancy between the two major trading partners. Accurate U.S. export statistics, the lowering of trade barriers resulting from the U.S./Canada Free Trade Agreement, and strong offshore demand for U.S. frozen potatoes are all expected to have a positive impact on the U.S. vegetable trade deficit.

The United States imports the majority of its vegetables from Mexico. During the 1980's, the mix of vegetables imported changed. The traditional vegetable imports have been the 6 winter fresh vegetables (snap beans, cucumbers, eggplant, bell peppers, squash, and tomatoes) which enter during the October-June period. However, Mexico has diversified its product mix and extended its export season. Mexico now is an important supplier of frozen broccoli, cauliflower, and okra, fresh bulb and green onions, and processed tomatoes.

Interestingly during the second-half of the 1980's Mexico's economy rebounded, as the peso stabilized relative to the U.S. dollar, and Mexicans expanded their taste for U.S. vegetables. The value of U.S. vegetable exports to Mexico in 1989 likely will reach \$18 million, a twofold increase from 1988. The major vegetable exports to Mexico are fresh potatoes, celery, onions, tomato sauce, and canned sweet corn.

Mexico is likely to grow in the 1990's as an importer of U.S. vegetables. The influx of U.S. investment in major vegetable packing and processing facilities has given many potential emigrants local jobs and boosted the local economy. The expansion of vegetable acreage during the late 1980's in new regions of Mexico has increased the demand for workers and has caused farm wages to rise in Mexico. Wages are likely to continue to rise in Mexico and reduce the number of workers available to the U.S. vegetable industry. During the 1990's Mexico is likely to face rising wage rates, which narrows its competitive position with the United States, though U.S. farm labor supplies likely will remain ample due to the pool of illegal workers.

Trade between the U.S. and Canada will also increase during the 1990's. Increased U.S. vegetable exports to Canada is expected to result from the Free Trade Agreement, but Canadian exports of vegetables to the U.S. will also increase. The scenario between the United States and Canada may unfold to mirror the recent developments in trade between the U.S. and Mexico and the United States and several South American countries. The key to changes in trade will be the opening up of investment opportunities between the two countries.

Foreign demand for frozen french fried potatoes during the second half of the 1980's has significantly improved the vegetable trade deficit. The United States remains a net exporter of processed potatoes, as 1989 exports of frozen potatoes through August ran 22 percent ahead of the same period last year. Japan, the largest importer, accounted for three-quarters of U.S. frozen potato exports in 1988.

The 1990's may see relative shifts in trade flows of U.S. imported vegetables. Trade barriers are likely to be relaxed due to existing bilateral agreements, like the U.S./Israel accord and the signing of multinational agreements like the General Agreement of Trade and Tariffs. Shifts in suppliers of U.S. vegetable imports have already transpired for both processed tomatoes and canned mushrooms.

Canned mushrooms are by far the most important category of mushroom imports, and made up 98 percent of total mushroom imports in 1988. Although the volume of canned imports is overwhelming, advances in technology and strong demand have substantially boosted fresh and frozen mushroom imports in the last 10 years.

Although canned mushroom imports from China accounted for 48 percent of the 1988 U.S. total, the United States halted these imports in October 1989 because of bacteria. Supplies of canned mushrooms for the remainder of 1989 are therefore likely to tighten somewhat, though U.S. production of processing mushrooms rose 13 percent for the 1988/89 season.

Commodity Outlook

Fresh Vegetable Acreage in 1989 Up Slightly

Based on seasonal harvested acreage estimates for the major fresh vegetables (asparagus, broccoli, carrots, cauliflower, celery, sweet corn, lettuce, onions, tomatoes, and honeydews), total acreage likely will rise 4 percent to 1.2 million acres, compared to 1.1 million harvested acres in 1988. Vegetable growers were hit early in the year with heavy rains then a freeze in Florida, followed by continued hot and dry weather in the West but excessive moisture in the East. Stronger grower prices for most major fresh vegetables resulted from a succession of weather-induced effects on seasonal yields. Lower domestic shipments of cabbage, cucumber, lettuce, and tomatoes during 1989 were offset by higher shipments of cantaloupe, watermelon, carrots, celery, and onions.

Preliminary ERS estimates of 1989 vegetable production for the 10 major fresh vegetables places the total at 253 million cwt, up 1 percent from 1988 (table 1). ERS projections for fresh vegetable production through 1995 call for trend increases of about 2 percent per year. This increase reflects continued strong per capita disposable incomes, and population growth.

The index of prices received by fresh vegetable growers is expected to rise 8-10 percent this year compared with 138 (1977=100) in 1988. Much of the increase in vegetable prices is attributable to the adverse weather during the year. However, some of the increase can be explained by stronger demand at the foodservice level for value-added vegetables, like shredded lettuce. As growers look into the 1990's, prices are likely to remain favorable due to the continued growth in value-added produce, increased exports and the potential shifts in supply locations due to chemical restrictions. However, several factors having price depressing effects may include increased import competition and the over-saturation of the organic vegetable market.

As grower prices rose during 1989, the retail price index for fresh vegetables, including potatoes, also rose 10-12 percent compared to 129 (1982-84=100) in 1988. Higher retail prices resulted mainly from rising grower level prices, but retailers were faced with stronger foodservice demand which bid away potential supply. Retail prices for fresh vegetables increased more than overall food prices, which are expected to rise nearly 6 percent in 1989. Retailers' costs of goods increased due to stronger foodservice demand, higher packaging costs, higher advertising costs, and higher labor costs. Factors further increasing retail prices during the next decade will be the rising costs of labor and transportation.

Record Contracted Processing Production in 1989

Processors faced nearly depleted inventories this season from drought-reduced pack in 1988. Consequently, contract intentions and production reached a record 15 billion tons in 1989, up 29 percent from last year. Processing tomatoes, the volume leader in the processing vegetable industry, realized a 31 percent increase in production. However, snap bean output soared 51 percent to .8 million tons, sweet corn rose 25 percent to 3 million tons, and green peas jumped 60 percent to half a million tons. The drought was the most important determinant in acreage expansion, however, the processing tomato industry is in the midst of a demand expansion in the fast-food sector. In addition, the canning vegetable industry has made great strides to recapture market share in processed vegetable consumption by introducing microwavable "canned" vegetables.

Research of at-home-food consumption indicated that the microwave has also played a key role in expansion of frozen vegetable consumption. Even though at-home-food consumption is not growing as fast as away-from-home food consumption, the technological innovations by the canning industry to penetrate the upscale-convenience at-home market will continue in the 1990's.

Processed vegetable growers received significantly higher contract prices in 1989 as processors were faced with attractive prices for competing agricultural crops and the need to rebuild

depleted inventories. Contract price increases combined with larger production will boost the cash receipts of processed vegetable growers for the year.

Prices of processed vegetables at the retail level also increased, likely rising 11 percent for 1989 from 112 (1982-84=100) in 1988. Retail prices for both canned and frozen vegetables rose only slightly in the third quarter as expectations of larger packs surfaced. However, prices inched higher during the fall, likely rising 1-2 percent for the fourth quarter. Higher prices returned as the retail supply of several vegetables continued to remain short, particularly processed tomato products, and untimely rains and the earthquake hit California during the final weeks of the processing tomato harvest causing some yield reduction.

Strong Potato Prices during 1988/89 Bring Modest Production Increase

Total 1989 potato production rose 3 percent to 367 million cwt from last year's drought-reduced level. Modest increases in production were seen during the winter, spring, and summer seasons. First indications of the fall output place it 3 percent above last fall's 314 million cwt and below what traditionally has been seen during a year of strong prices. Typically potato growers increase production more than the given potato price increase. However, grower prices for potatoes rose 47 percent during 1989 but production rose just 3 percent. Production of fall potatoes was lower than expected as competition for competing crops was very strong. Bad weather in the Red River Valley, Idaho, and Washington reduced fall output in regions heavily devoted to processing. Processors already faced short supplies of frozen and chip stock.

As processing demand will remain strong in the 1989/90 season and 1989 fall output only rose moderately, prices of potatoes at all levels will remain strong. Grower prices for the 1989/90 season likely may average near the \$6.02 per cwt of the 1988/89 season. Other price enhancing factors will be continued strong export demand for frozen potatoes and strength in the fresh market prices.

Dry Edible Bean Output Rebounds in 1989

Estimated 1989 dry edible bean production was 25 percent higher than last year's drought-reduced crop of 19 million cwt. Even though production rose, prices appear to be holding during the first-quarter of the 1989/90 season as stocks were depleted and demand remained firm. Grower prices for the 1989/90 season likely will average one-fifth lower than the \$30 per cwt for the previous season. Production estimations for the next decade portend a yearly increase of about 1 percent. Factors influencing increased production are stronger demand for high nutritional commodities and increased diversification of program farmers who have expertise in bean production.

U.S. exports of pintos and black beans may continue strong through 1989 because of low South American supplies. Indeed, this shortage may even boost exports of great northern and other white beans. Also Brazil has exempted dry beans from duties, which could lead to U.S. export gains. Exports of dry beans have not been predictable during much of the 1980's with

exports rising when South or Latin American countries have supply shortages. However as Mexico has entered the GATT and agreed to a bilateral agreement with the United States, the 1990's may provide more consistent U.S. exports of dry beans.

Organic Vegetable Production Likely to Increase in 1990's

Even though no national estimates for organic production exist, concerns about the safety of produce have lead to increased supply. Based on information obtained from national organic wholesalers much of the supply originates in California, though the continued strong price differential between organic and non-organic has stimulated growers in other areas to allocate acreage to organic. Price differentials between organic and non-organic vary considerably according to the Organic Market News Information Service (OMNIS).

Price differentials vary because of the wide range in input costs associated with organic production. Organic vegetables can be grown using high input organic techniques--applying organic pesticides--to low input organic techniques which would not require schedule applications of pesticides. Input costs under the high input techniques would logically be greater than the low input technique, however research results from a study done in California showed that high input techniques kept yields close to conventional yields while low input techniques severely reduced yields. Thus as demand increases for organic vegetables, growers are going to likely choose techniques which keep yields high in order to maximize returns.

Organic production of vegetables in the 1990's likely will increase to fill market niches, however, organic production will by no means supplant the entire market for fresh vegetables. As market niches become saturated and legislation is enacted to standardize organic production and labeling requirements, price differentials between organic and non-organic vegetables will likely be minimized.

Table 1.--Vegetables: Prices and production estimates

Variable name	Units	1988				1989				Annual 1/ 1989/1988	Percent change	
		QI	QII	QIII	QIV	Annual 1/ 1988	QI	QII	QIII			QIV
-----Grower prices-----												
Potatoes 2/	\$/cwt	3.81	4.33	5.21	5.29	6.02	6.67	8.51	7.75	5.50	6.50	8%
Dry edible beans 2/	\$/cwt	14.67	18.77	26.77	30.13	30.30	31.30	31.97	28.27	24.50	24.00	-21%
Commercial vegetables, prices received index 1910-14=100		806	611	703	698	705	823	834	709	618	746	6%
Fresh vegetables, prices received index 1977=100		165	112	139	138	138	163	154	139	148	151	9%
-----Wholesale price indices-----												
Fresh vegetables 1982=100		110	91	101	101	100	108	122	96	100	106	6%
Potatoes 1982=100		104	112	113	103	108	164	155	147	134	150	39%
Canned vegetables 1982=100		103	103	110	116	108	119	119	119	115	118	9%
Frozen vegetables 1982=100		107	107	109	112	108	114	115	116	115	115	6%
-----Retail price indices-----												
Fresh vegetables 1982-84=100		134	125	128	130	129	142	149	143	138	143	11%
Potatoes 1982-84=100		106	116	128	127	119	139	165	172	152	157	32%
Processed vegetables 1982-84=100		108	109	114	118	112	122	125	126	125	124	11%
-----Production-----												
Total vegetables 3/	1000 cwt					254,278					259,329	2%
Fresh vegetables	1000 cwt					249,730					253,476	1%
Processed vegetables	1000 cwt					227,409					292,645	29%
Mushrooms	1000 cwt					6,317					7,227	14%
Potatoes	1000 cwt					356,438					367,280	3%
Sweetpotatoes	1000 cwt					11,832					12,716	7%
Dry edible beans	1000 cwt					19,230					23,991	25%

1/ Annual prices for potatoes and dry edible beans are season average for crop year. 2/ Calendar quarters and season average. 3/ Includes fresh and processed.

Source: NASS, USDA; BLS, USDC; and ERS, USDA.

Table 2.--Vegetables, commercially produced: Total U.S. per capita utilization, 1970-88

Year	Grand total	Total fresh and processed	Vegetables			Potatoes				Sweet potatoes 7/ Total	Mushrooms		Dry peas & lentils		
			Fresh 1/ Total	Canning 2/ Total	Freezing 3/ Total	Fresh 4/ Total	Freezing 5/ Total	Chips 6/ Total	Other 7/ Total		Fresh 8/ Total	Processing 9/ Total			
Pounds per person, farm-weight															
1970-75	303.2	177.9	72.3	92.0	13.7	118.3	55.1	31.4	16.5	15.3	5.0	1.6	0.5	1.1	0.4
1976	314.0	183.3	75.3	94.1	13.9	122.8	49.4	39.4	15.8	18.2	5.4	2.1	0.7	1.4	0.4
1977	312.0	182.7	75.2	92.1	15.4	121.8	50.1	41.9	16.2	13.6	4.7	2.4	0.9	1.5	0.4
1978	306.0	177.8	76.5	87.0	14.3	120.2	46.1	43.3	16.8	14.0	5.0	2.6	1.0	1.6	0.4
1979	312.6	185.3	79.1	91.2	15.0	119.0	49.6	39.7	16.9	12.8	5.2	2.7	1.1	1.6	0.4
1980	309.2	185.5	80.5	90.6	14.4	116.0	51.1	36.9	16.7	11.3	4.5	2.8	1.2	1.6	0.4
1981	294.7	174.0	79.3	80.0	14.7	112.7	45.7	37.8	16.8	12.4	4.8	2.8	1.4	1.4	0.4
1982	298.6	174.7	82.3	78.9	13.5	114.9	46.6	39.1	17.2	12.0	5.5	3.1	1.4	1.7	0.4
1983	302.9	176.6	82.5	79.6	14.5	118.1	49.9	38.7	17.9	11.6	4.6	3.1	1.6	1.5	0.5
1984	318.5	190.3	87.6	85.2	17.5	119.2	48.8	40.5	18.1	11.8	5.0	3.6	1.8	1.8	0.4
1985	323.4	192.7	88.0	87.5	17.2	121.3	46.6	44.0	17.7	13.0	5.4	3.5	1.8	1.7	0.5
1986	333.2	198.7	95.3	87.6	15.8	126.0	49.6	45.9	18.2	12.3	4.5	3.6	1.9	1.7	0.4
1987	334.8	202.3	98.5	87.0	16.8	124.0	48.4	45.7	17.7	12.2	4.5	3.6	1.9	1.7	0.4
1988	336.2	200.6	100.3	82.8	17.5	127.3	54.6	43.9	17.0	11.8	4.4	3.5	2.0	1.5	0.4

1/ Includes asparagus, broccoli, carrots, cauliflower, celery, sweet corn, lettuce, onions, tomatoes, and honeydews. 2/ Includes asparagus, snap beans, carrots, sweet corn, green peas, pickles, and tomatoes. 3/ Includes asparagus, snap beans, broccoli, carrots, cauliflower, sweet corn, green peas.

4/ Use estimates adjusted due to previous error in calculation. 5/ Includes chip and shoestrings, and canning. 6/ Includes canning and dehydrating.

7/ Use estimates now include feed, seed, home use, and shrinkage. 8/ Includes canning, freezing, and dehydrating.

Source: Economic Research Service, USDA.

Table 3.--Vegetable, potato and dry edible bean prices and indices, selected years

Item	Unit	1970	1975	1980	1985	1986	1987	1988	1989f	1990f
Grower prices:										
Fresh	: 1977=100	56	88	110	122	123	147	138	151	147
Comerical	: 1977=100	103	164	196	129	130	144	144	156	155
Potatoes	: \$/cwt	2.21	4.48	6.55	3.92	5.03	4.38	6.02	6.50	4.80
Dry beans	: \$/cwt	9.21	21.10	27.60	17.60	19.10	16.50	30.30	24.00	23.00
Wholesale prices:										
Fresh	: 1982=100	55.1	84.5	84.3	100.3	99.4	99.0	100.4	106.0	108.7
Potatoes	: 1982=100	41.7	75.6	103.3	101.3	104.1	120.1	108.0	150.0	156.1
Dry beans	: 1982=100	25.7	49.7	81.0	84.8	64.1	78.7	144.5	114.5	141.1
Retail prices:										
Commercial	: 1982-84=100:	39.4	55.6	79.0	103.5	107.7	121.6	129.0	143.0	149.4
Potatoes	: Cents/lb	38.0	57.7	19.1	20.8	24.1	27.6	26.1	35.2	36.8
Processed	: 1982-84=100:	36.6	62.2	83.1	104.4	104.2	107.1	112.0	124.2	129.8

Sources: National Agricultural Statistics Service, USDA and Bureau of Labor Statistics, Department of Labor.



1990 OUTLOOK FOR FRUIT AND TREE NUTS

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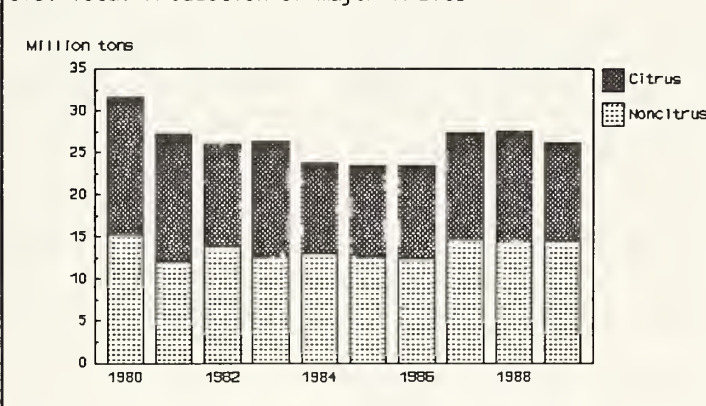
OVERVIEW

The fruit industry expects smaller supplies of many noncitrus and citrus fruits this year because of various weather related factors and disease problems that plagued growers in some areas of the country (figure 1). Production of the major noncitrus fruits is expected to be up only fractionally from 1988 due to larger crops of apples, apricots, cherries, prunes, and plums which just offset smaller crops of grapes, nectarines, peaches, pears, and strawberries. All citrus crops are also expected to be smaller, with most of the expected production shortfall forecast for Florida, the largest citrus producing State. In addition, smaller crops are expected this year for almonds, pecans, hazelnuts, and pistachios, and only a moderate increase is forecast for the 1989 walnut crop.

Demand for fruits and tree nuts has been strong this year in both domestic and export markets despite shorter supplies of various commodities and relatively higher prices.

The situation is not likely to change much in the near future with the strong domestic economy and relatively favorable exchange rate between the U.S. dollar and the currencies of major U.S. export markets. Expected smaller citrus supplies and heavy demand will keep upward pressure on prices for most citrus commodities. Similarly, with shorter supplies and heavy demand for several noncitrus fruits and tree nuts, prices are also expected to remain above last year. Apples are an exception because of this season's large crop, which likely will keep apple prices low through the season.

Figure 1
U.S. Total Production of Major Fruits



Total per capita fruit consumption may be down in 1989 due to the relatively smaller domestic fruit supplies and higher expected prices. Per capita fruit consumption was estimated at 211 pounds (fresh weight equivalent) in 1988, down slightly from the previous year's record 214 pounds (figure 2). Most of the decline was due to decreased fresh fruit consumption which dropped 4 percent from the previous year to 97 pounds. On the other hand, per capita consumption of processed fruit rose from 113 pounds in 1987 to 114 in 1988. Similarly, per capita consumption of tree nuts rose to a record 2.5 pounds in 1988.

GENERAL PRICE OUTLOOK

In October, the index of grower prices for all fruit (fresh and processing) reached it's highest level this year and was almost 12 percent above a year ago (figure 3). Smaller citrus supplies expected throughout the season are likely to provide some upward pressure on the index, but heavier imports of frozen concentrated orange juice (FCOJ) likely will depress grower prices for processing oranges. Larger apple supplies and lower apple prices will also keep some downward pressure on the index.

The Bureau of Labor Statistics' (BLS) Consumer Price Index (CPI) for fresh fruit continued to rise in October, boosted by higher retail prices for valencia oranges, lemons, peaches, grapes, and strawberries. The October CPI stood at 157 (1982-84=100), 1 percent above September and 5 percent above a year ago. The index is likely to drop this fall with seasonally increased supplies of apples, pears, and citrus, and may even fall below a year earlier due to heavy supplies of fresh market apples.

Owing to smaller packs of several canned and frozen fruits and higher retail prices, the CPI for processed fruit advanced to 128 (1982-84=100) in October, slightly up from September, but 2 percent greater than a year earlier. Retail prices of frozen fruit and juice averaged 2 percent above a year earlier, while canned and dried fruit prices were 4 percent higher. The index is not likely

Figure 2
U.S. Per Capita Fruit Consumption

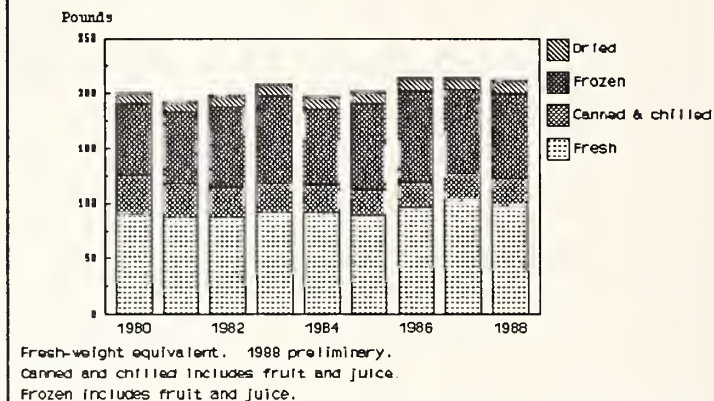
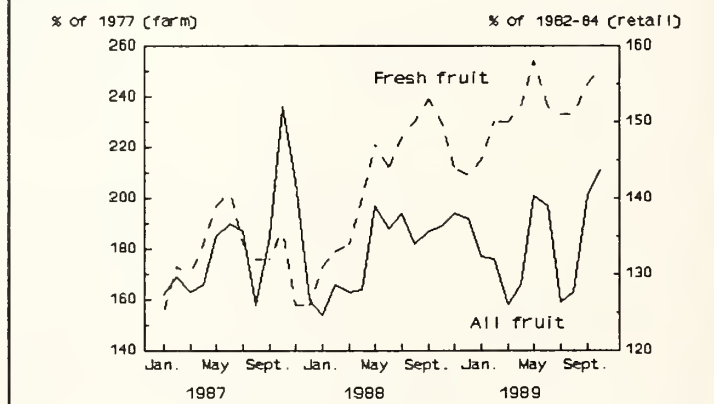


Figure 3
U.S. Fruit Prices



to advance appreciably more this year, but likely will remain above last year's levels.

COMMODITY OUTLOOK

Citrus

The October 1 forecast of the 1989/90 U.S. citrus crop placed total production (excluding grapefruit in California's "other areas") at 11.7 million short tons (279 million boxes), down 10 percent from last season and 29 percent from 1979/80's record 16.5 million short tons (table 1). The lower crop expectation largely reflects the damage to Florida groves caused by freezing weather last February that killed open blooms and damaged new growth. Florida citrus production is forecast at 8.1 million short tons, 14 percent below last season. Production of all citrus crops is also expected to be down in Texas and Arizona, but total California production, at 3.1 million short tons (excluding grapefruit production from California's "other areas"), will be up 5 percent if the forecast is realized.

Oranges

Prospects for the 1989/90 orange season (November/October) point to a smaller domestic crop of processing oranges and a larger crop for the fresh market.

Table 1--Citrus Production, United States, 1987-89

Commodity				Change from	
	1979/80	1988/89	1989/90	1979/80	1988/89
	--1,000 tons--			--Percent--	
Orange	11,832	8,878	8,274	-30	-7
Navel 1/	6,658	5,186	4,627	-31	-11
Valencia	5,174	3,692	3,647	-30	-1
Grapefruit	2,986	2,861	2/ 2,231	-25	-22
Lemons	789	759	749	-5	-1
Tangelos	288	171	158	-45	-8
Tangerines	275	239	197	-28	-18
Temples	270	169	135	-50	-20
Total	16,440	13,077	11,744	-29	-10

1/ Includes early and midseason varities. 2/ Excludes California "other areas."

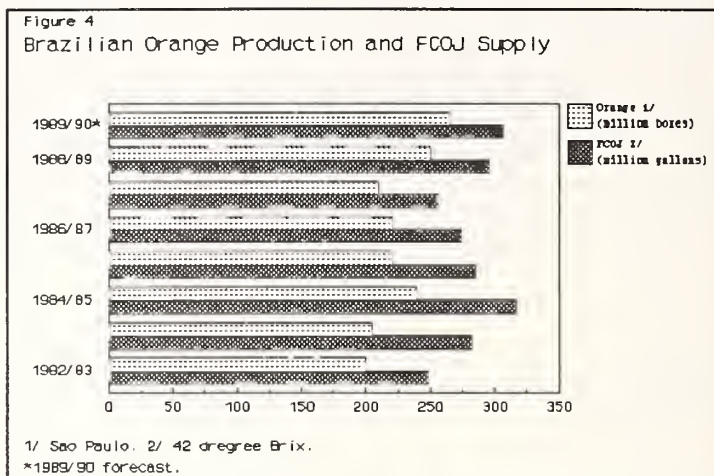
Source: November 1989, Crop Production, NASS, USDA.

In Florida, where 74 percent of the total U.S. orange crop was produced last year, the 1989/90 crop is forecast at 5.9 million short tons (130 million boxes), down 11 percent from last season. The smaller crop will have the largest impact on the Florida processing industry, which handled over 93 percent of the State's orange production during the past several seasons.

On the other hand, production in California, which supplied 78 percent of the total U.S. production used for fresh market last year, is forecast up 7 percent, at 2.3 million short tons (61 million boxes). A forecast larger Texas orange crop will also enhance fresh market supplies.

Despite the expected smaller Florida orange crop, Florida growers are not likely to see a corresponding increase in prices during the 1989/90 marketing season because of the likelihood of increased FCOJ imports from Brazil. World orange juice supplies are expected to be up about 6 percent from last season, with Brazil expected to produce a record 307 million gallons (42 degrees Brix) (figure 4).

Consequently, the Florida Department of Citrus estimates that on-tree prices for Florida growers will average around \$5.89 a box in 1989/90, 19 percent below last season.



Even with the larger orange crop expected in California this season, grower prices for fresh market oranges are likely to remain steady or rise from last year, reflecting the crop's high quality and strong export demand.

Continuing strong demand for orange juice and larger crops have contributed to a steady rise in the proportion of U.S. orange production used for processing over the past 6 years. The share reached 78 percent in 1988/89, the highest since 1980/81. According to the Florida Department of Citrus, Florida orange juice production is expected to account for 70 percent of total U.S. consumption of orange juice in 1988/89. However, Florida's FCOJ output from domestic fruit will likely be curtailed in 1989/90 with the smaller Florida crop and expectations for a lower juice yield. The Florida Department of Citrus estimates Florida's share of total U.S. orange juice consumption may drop as low as 55 percent in 1989/90.

The Brazilian processing industry will benefit from increased U.S. demand for FCOJ which will help move the record large Brazilian crop expected this year. In anticipation of heavy supplies, Brazilian processors announced a price decline for FCOJ in September from \$1.85 per pound solids to \$1.60. Following the lead, Florida processors reduced private label list prices about 10 percent in mid-October. The reduction has stimulated FCOJ movement from

Florida over the past few weeks, which may leave Florida processors holding carryover stocks only moderately above the 42 million gallons carried over from last season. The price reductions may also stimulate consumer demand for FCOJ that has been dampened by relatively high prices in recent years.

The outlook for good supplies of quality navel oranges in California, relatively favorable foreign exchange rates between the U.S. dollar and the currencies of several major importing countries, and strong foreign demand should help boost U.S. fresh orange exports this season. The Pacific Rim countries continue to be strong markets for U.S. fresh oranges, with Japan and Hong Kong alone accounting for 60 percent of exports during the first 10 months of 1988/89, up 3 percent from the same period in 1987/88. Japan is the largest single market, but exports to Hong Kong are growing at a much faster rate despite an increase in the Japanese import quota for U.S. fresh oranges.

Grapefruit

The 1989/90 U.S. grapefruit crop, excluding production in California's "other areas," is forecast at 2.2 million short tons (54.2 million boxes), 17 percent below the previous season and 15 percent below 1987/88. Production in Florida, the largest producing State, is forecast down 20 percent from last season due to damage sustained during February's freezing temperatures. While Texas grapefruit production is also forecast moderately lower, larger crops are expected in California's desert region and in Arizona.

Despite the significantly smaller crop, many in the industry feel that total 1989/90 grapefruit supplies will be adequate to satisfy both domestic and export market demand for fresh grapefruit at somewhat higher prices. Early-season f.o.b. prices have ranged higher than last season in Florida and are likely to remain strong as the season progresses. Larger carryin stocks of most processed grapefruit products in Florida should help keep processing demand for grapefruit relatively soft this season. Movement is likely to be sluggish with recently announced f.o.b. price advances for frozen grapefruit juice concentrate and chilled grapefruit juice at Florida plants.

Lemons

Domestic lemon supplies will continue tight during 1989/90 (August/September) with production (tree crop available for harvest) forecast at 749,000 short tons (19.7 million boxes), down 1 percent from last season and almost 5 percent from 1987/88. Production in Arizona is expected to decline 16 percent from last season, at 122,000 short tons, while California production is expected to rise 2 percent.

Shorter domestic supplies over the past 2 seasons have boosted fresh market prices and resulted in a larger proportion of the lemon crop being channeled into the fresh market. In 1988/89, 61 percent of the crop went for fresh market use, compared with 58 percent in 1987/88 and 43 percent in 1986/87. The proportion of the total crop used for fresh market is likely to increase again in 1989/90 with the expected smaller crop and higher fresh market prices. As of mid-October, fresh market deliveries and export market

shipments were both up 4 percent from a year ago, accounting for 50 and 26 percent of total shipments, respectively.

Noncitrus

The 1989 noncitrus crop--including major tree fruits, grapes, and strawberries--is forecast at 14.7 million short tons, up 3 percent from 1988 (table 2). The larger crop expectation is the result of larger apple, apricot, cherry, plum and prune production. However, supplies of several other important fruits including grapes, nectarines, peaches, pears, and strawberries are relatively short this year. Consequently, prices have ranged higher this year than last.

Apples

Supported by continuing good crop conditions in the Western States, the final forecast for the 1989/90 U.S. apple crop is 9.63 billion pounds, up 5 percent from 1988/89. Production in the seven States that comprise the Western area (California, Washington, Oregon, Idaho, Utah, New Mexico, and Colorado) is expected to reach 5.6 billion pounds, 14 percent more than last year's crop. Similarly, production in the Central region (Illinois, Indiana, Iowa, Kansas, Michigan, Minnesota, Montana, Missouri, Ohio, Kentucky, Tennessee, Arkansas, and Wisconsin) is also expected to exceed last season's drought-reduced production by 20 percent, at 1.5 billion pounds. The larger apple crops in

Table 2--Production of Selected Noncitrus Fruit, United States, 1987-89

Commodity	Change from				
	1987	1988	1989	1987	1988
	--1,000 tons--			--Percent--	
Apples	5,374	4,579	4,814	-10	5
Apricots	115	102	118	3	16
Cherries	394	304	315	-20	4
Grapes	5,264	5,986	5,879	12	-2
Nectarines	191	200	190	-1	-5
Peaches	1,195	1,310	1,138	-5	-13
Pears	940	861	842	-10	-2
Prunes/Plums	979	750	866	-22	15
Strawberries	556	563	533	-4	-5
Total	15,008	14,655	14,695	-2	3

Source: November 1989, Crop Production, NASS, USDA.

these two regions will keep downward pressure on fresh market prices during the current marketing season.

Poor pollination and set caused by heavier than normal rainfall early in the season, followed by disease problems through the summer, reduced crop prospects from Pennsylvania to Maine. Consequently, production in the Eastern States (Connecticut, Delaware, Georgia, Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, New York, New Jersey, Pennsylvania, Maryland, Virginia, West Virginia, North Carolina, and South Carolina) is forecast down 15 percent from last season, at 2.5 billion pounds. The smaller Eastern crop may provide some strength to grower prices for processing apples this season, but any impact on retail prices for processed apple products is not likely to be felt until later next year due to heavier season carryin of many processed apple products.

Because of the record large crop expected in Washington, shipments from that State were running at their highest level ever through October. As a result, shipping point prices in many parts of the country are sharply lower than last year. Similarly, the October average grower price was 15.9 cents per pound for fresh apples compared with 18.3 cents in 1988.

In early November, a group of 17 grower-owned marketing cooperatives in Washington agreed to set a floor price of \$9.00 per box for the apples they market this year. Although the \$9.00 floor price is below the \$10.00 break-even price for growers estimated by the group, the group believes that the collective effort will help curtail declining grower prices and stabilize the apple market without a negative impact on retail prices. The group is estimated to account for about 28 percent of total Washington apple production this year. All Washington apple growers are being encouraged to comply with the floor price.

The U.S. apple industry is under increasing pressure from upwardly trending domestic and world production, relatively lower season average prices, and mounting consumer concern over the use of pesticides and other agricultural chemicals. Consumer demand for apples was immediately shaken last February due to media coverage of the possible health risks of consuming apples treated with Alar, a chemical growth regulator. Alar concerns also significantly disrupted U.S. fresh apple exports to several major foreign markets during March and April. The future of the U.S. apple industry over the next several years will hinge on their ability to ease consumer concerns over pesticide use and successfully market increasingly larger supplies while maintaining returns acceptable to growers.

Grapes

The 1989 U.S. grape crop is forecast at 5.88 million short tons, 2 percent below last year, but 12 percent larger than 1987. Smaller crops of table- and wine-type grapes in California more than offset a larger crop of raisin-type grapes. Production is also forecast down 1 percent in New York, at 155,000 short tons, because of drought last year that stressed several varieties. Michigan's grape crop is also forecast down 15 percent from 1988's 53,000

short tons. Conversely, Washington's grape crop is expected to reach 220,000 short tons, up 21 percent from 1988. Despite California's smaller total crop forecast, the State is expected to account for 91 percent of the U.S. crop this year, about the same as last year.

Fresh grape shipments through October 1 were almost 8 percent ahead of the same period a year ago. Demand has been strong reflecting the availability of good-size, high quality grapes this season and active advertising and promotion campaigns undertaken by the industry, wholesalers, and retailers. Heavier shipments through October 1, a smaller crop of table grape varieties, and lower cold storage stocks likely will lead to a tighter market as the season progresses.

Rain and high humidity made for poor drying conditions for several days in September, at which time an estimated 40 percent of the total raisin crop was exposed. However, excellent drying conditions before and after the period greatly moderated what might have been a disaster for raisin producers this year and the raisin crop likely will be the largest in recent years. Lower shipments and high inventories of wine from the large 1988 crush softened the demand for crushing grapes this year compared to last. As of early October, total crush for wine was about 3 percent behind the same time a year ago. Prices paid by wineries in the San Joaquin valley area are also reported to be lower than last year.

The U.S. net foreign trade position for wine improved during the first 8 months of 1989, with exports up 21 percent relative to an 8 percent decline in imports. Exports to all major export markets were up despite a somewhat stronger dollar in some important markets. U.S. wine exports are likely to continue strong with increased promotional allocations through the Targeted Export Assistance (TEA) program, and relatively favorable exchange rates between the U.S. dollar and other foreign currencies.

1989/90 Prospects For Processed Noncitrus Fruits

Canned Fruits

Reflecting smaller supplies of California clingstone peaches this year, the California League of Food Processors reported that 16.4 million cases (basis 24 No. 2-1/2's) of clingstones were packed in 1989/90, down 4 percent from last season. The smaller pack helped to alleviate carryin stocks which were 64 percent higher than last season, at 2.3 million cases, resulting in total supplies only 2 percent above last year. The smaller California crop also helped to boost grower prices almost \$5.00 a ton above the \$212.75 base price paid by processors last season. Movement of canned clingstone peaches during the first 4 months of the season (June/May) has been sluggish and stocks onhand on October 1 were 15 percent heavier than a year ago (figure 5).

Although data are not yet available, industry sources are reporting that the 1989/90 season bartlett pear pack appears adequate. With raw pear supplies forecast down 4 percent from last year at 295,000 short tons, and carryin stocks of canned pears 9 percent lower than last season's 1.98 million cases

(basis 24 No. 2-1/2's), total canned pear supplies will be somewhat tighter this year. Because of the shorter bartlett crops in Washington and Oregon, growers received more for processing pears than for fresh market. The Washington-Oregon Canning Pear Association reported processors in the area set the price before harvest at \$230 per ton for No. 1 bartletts, the highest on record.

Reflecting this year's larger apple crop, industry sources estimate 1989 apple utilization for processing at 97.5 million 42-pound bushels, 6.5 percent more than last year. The estimate represents 42 percent of the forecast 1989 crop, about the same used for processing last season. Juicing and canning are estimated to account for 84 percent of total processed apple utilization this year, the same as in 1988.

Reflecting the smaller crops of several noncitrus fruits and higher prices paid by canners for raw product, the October Producer Price Index reported by the Bureau of Labor Statistics (BLS) was 119.3 (1982-84=100), fractionally lower than September, but 3.6 percent higher than a year ago. Prices are likely to remain relatively firm through the season, although canners may offer promotional allowances or discounts to retailers to move selected can sizes.

Frozen Fruit

The 1989 pack of frozen fruit and berries is expected to be below 1988. Cold storage inventories as of September 30 were 14 percent below a year ago, at 855.1 million pounds (figure 6). Inventories were down for all frozen fruits except apricots and sweet cherries.

Production shortfalls in Washington and Oregon, and reduced imports from Mexico contributed to tighter supplies of frozen strawberries this year. Lower fresh market prices in California prompted some diversion of fresh strawberries to processors in that State, but cold storage holdings on September 30, at 230.4 million pounds, were still 26 percent below a year ago.

Figure 5
Stocks of Selected Canned Fruit

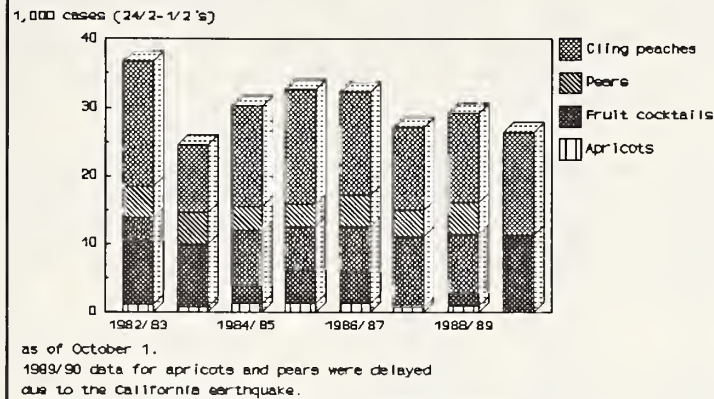
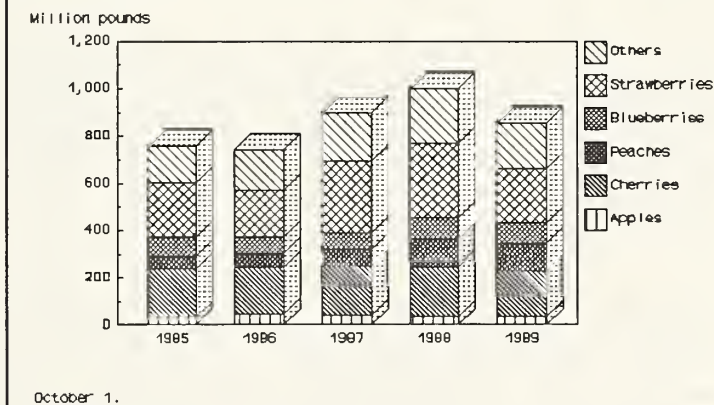


Figure 6
Cold Storage Holdings



Tighter supplies have led to significantly higher prices at processing plants this year. Although growing fresh market demand in Mexico contributed to a lower Mexican frozen strawberry pack in 1988/89 and reduced exports, short U.S. supplies and higher prices for frozen strawberries in the United States may be favorable for increasing imports from Mexico as their 1989/90 season begins in October.

The industry estimates that freezers packed 137.9 million pounds of red tart cherries in 1989/90, bringing total supplies to 194.5 million pounds, 10 percent below last season. However, demand has been sluggish and prices remain relatively low. Markets for other raw berries are also currently somewhat inactive.

Following price declines for FCOJ and ample supplies of many raw berries, the Producer Price Index (PPI) for frozen fruits and juices dropped to 125.6 (1982-84=100) in October from September's 127.4, and was 3.1 percent below a year ago. The index may not show much strength for the remainder of the year owing to lower FCOJ prices which will offset higher prices for frozen grapefruit juice concentrate, prospects for heavier U.S. imports of Mexican frozen strawberries, and somewhat sluggish demand for frozen cherries.

Tree Nuts

Total U.S. supplies of all tree nuts have grown nearly 150 percent since 1970. In 1988/89, total supplies reached a record 1.3 billion pounds, up 9 percent from the previous season. The record 1988/89 supply included the second largest production level for domestically grown tree nuts, near record imports, and record beginning stocks. However, smaller crops are expected this year for almonds, pecans, hazelnuts, and pistachios, and walnut production is expected to be only slightly up (table 3). Strong domestic and export market demand likely will boost grower prices, but grower cash receipts may fall as price increases are not likely to offset lower production levels.

Almonds

This year's California almond crop is forecast at 425 million pounds (shelled basis), down 28 percent from 1988's 590 million pounds. Trade sources indicate that the crop may fall below forecast due to wet weather, warm temperatures, and high humidity in September that contributed to mold growth and some loss of quality. At the time, 30 percent of the crop was still to be harvested. Prior to the rains, opening f.o.b. prices had been announced at levels moderately above the previous year.

As of September 30, about 240 million pounds of almonds had been received by handlers, compared with 324 million pounds a year earlier. Shipments to domestic buyers between July and the end of September totaled 47.7 million pounds, up 10 percent from a year earlier. Export shipments during the same period were 87.9 million pounds, down 30 percent from the previous year. Exports for the 1989/90 marketing season may fall 5 to 10 percent from last

Table 3--Tree nuts: Production in principal States, 1987, 1988, indicated 1989

Crop and State	1987	1988	Indicated 1989	Crop and State	1987	1988	Indicated 1989
	--1,000 pounds-- shelled basis				--Short tons-- in-shell basis		
Almonds:				Pecans:			
California	660,000	590,000	425,000	North Carolina	2,000	5,500	2,000
				South Carolina	3,400	6,500	1,200
				Georgia	115,000	110,000	95,000
				Florida	5,500	6,000	5,000
				Alabama	25,000	10,000	20,000
				Mississippi	12,000	10,000	10,000
Hazelnuts:				Arkansas	1,300	3,000	1,500
Oregon	21,500	16,300	12,800	Louisiana	19,000	22,000	13,000
Washington	300	200	200	Oklahoma	12,000	47,000	12,000
2 States	21,800	16,500	13,000	Texas	42,000	60,000	50,000
				New Mexico	25,000	26,000	29,000
Macadamia nuts:				California 1/		2,000	1,700
Hawaii	21,350	22,750	N/A	Total	262,200	308,000	240,400
Pistachios:				Improved			
California	16,550	47,000	14,000	varieties 2/	179,650	185,300	172,950
				Native and			
				seedling	82,550	122,700	67,450
Walnuts, English:							
California	247,000	206,000	210,000	Total 5 tree			
				nuts 3/	568,900	600,250	4/ 477,700

N/A=not available. 1/ Estimates began with the 1988 crop. 2/ Budded, grafted, or topworked varieties. 3/ Excludes almonds. 4/ Excludes macadamia nuts.

Sources: October 1989, Crop Production and Noncitrus Fruit and Tree Nuts, Midyear Supplement, NASS, USDA.

year's record because of strong domestic demand and a record large Spanish crop. However, primarily due to a good carryover supply of 1988 crop almonds, California is expected to have record domestic shipments.

Walnuts

As of September, 1989 California walnut production was forecast at 210,000 tons (in-shell basis), 2 percent above last year, but 15 percent below 1987's record. Smaller carryover stocks into the 1989/90 season (August/July) should result in supplies only slightly lower than a year ago. Prices likely will be about the same as last season, but will depend much on export as well as domestic demand. Foreign demand for U.S. walnuts is expected to be strong as supplies have been reduced in many foreign countries. In-shell walnut shipments to domestic and export markets during the first two months of the marketing year totaled 14.9 million pounds, up 33 percent from a year ago. Similarly, shelled walnut shipments during the same period were also up 6 percent. This is an early indication that demand continues strong in both domestic and export markets, which should help boost prices as the season progresses.

Pecans

Heavy rains in the Southeastern States caused significant damage and loss to this year's pecan crop. Also, dry weather occurred in a number of areas at a critical time when trees needed moisture for the nuts to fill properly. Consequently, USDA's October 1 forecast for the 1989 pecan crop placed production in 12 producing States at 240 million pounds (in-shell basis), down 22 percent from last year. The smaller crop expectation, combined with moderately lower cold storage holdings of shelled pecans may help boost prices this year. However, Mexico's pecan harvest is expected to reach 60-70 million pounds, and as much as half the crop may be exported to the United States. Larger U.S. pecan imports may dampen prospects for higher prices from smaller domestic supplies this year.

Hazelnuts (Filberts)

Oregon and Washington hazelnut growers are expected to harvest 13,000 short tons (in-shell basis) in 1989, compared with 16,500 tons last year. With harvest currently underway, nut size and quality are reported to be good. Shorter supplies and prospects for a good quality harvest may result in some improvement in grower prices this year.

World hazelnut production is expected to total 645,000 metric tons in 1989/90, up 9 percent from last season. Larger production combined with heavier carryin stocks should result in total world supplies of 790,000 metric tons, up 14 percent from 1988/89. Although consumption in several large hazelnut producing countries is expected to increase, ending stocks in Turkey, Italy, Spain, and the United States, the 4 largest producers, may approximate 147,000 tons next August, up sharply from carryover in previous seasons.

Pistachios

USDA's September 1 forecast for the 1989 California pistachio crop placed production at 28 million pounds, sharply below the record 94 million harvested last year. Pistachio production is cyclical due to the alternate bearing characteristics of pistachio trees and 1989 is an "off-year" in the alternating production cycle of this crop. Although yields are expected to be to lowest since 1981, early harvest reports indicate the nuts are showing excellent quality and size.

Based on deliveries through the end of October, the California Pistachio Commission now estimates that 29.9 million pounds of in-shell pistachios will be harvested this year. With carryover of snack types from last season reported at 23.3 million pounds, supplies in 1989/90 would total 53.2 million pounds, about one-half that of last season. Shorter domestic supplies and continuing strong domestic and export demand for U.S. pistachios should significantly boost grower prices in 1989/90.

INDUSTRY ISSUES

Issues confronting the U.S. fruit and tree nut industries in 1989/90 will include packaging and nutritional labeling regulations, as well as labor and water availability, but the biggest uncertainty will center around food safety. Two incidences this year served to rock consumer confidence in the safety of fresh fruit in U.S. markets. In February, apple shipments were disrupted after media attention was given to the possible health risks of consuming apples treated with alar. The alar scare was almost immediately followed by the discovery of cyanide in two grapes imported from Chile, which caused retailers to immediately remove all Chilean fruit from shelves and the detention of Chilean fruit imports while officials checked for cyanide or evidence of other tampering. While it appears that consumer demand for these two fruits was only temporarily disrupted, the incidences did serve to shake consumer confidence and heighten consumer concerns about food safety.

The increase in public concern over the use of pesticides in agricultural production, both in terms of its food safety and environmental impacts, is likely to result in the adoption of new legislative measures concerning pesticide use. There are currently two bills in the Congress dealing with food safety and pesticides. If either bill is passed before next year, it is possible that the provisions will be adopted in the 1990 Farm Bill legislation. Ultimately, U.S. fruit and tree nut producers are likely to see a decreasing number of chemicals registered for use on fruits and tree nuts. This will require the modification of traditional production practices to replace or limit the use of chemicals.



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**THE FOOD SAFETY CONTROVERSY:
IMPLICATIONS FOR THE FRESH PRODUCE INDUSTRY**

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Introduction

Per capita consumption of fresh produce increased by a healthy 16 percent between 1980 and 1988. Yet the emergence of the food safety controversy could eventually undermine public confidence in fresh produce. Produce industry leaders identify the food safety controversy as the number one issue facing the industry as it moves into the 1990s.

The purpose of this paper is to discuss the controversy and to assess the implications for the fresh produce industry. The paper will describe: 1) consumer attitudes about the safety of produce; 2) consumer demand for organics and other non-conventional produce; 3) use of food safety as a marketing strategy; 4) the role of the consumer advocates in the controversy; and 5) the scientific consensus regarding the safety of produce.

Consumer Attitudes About Food Safety

Several consumer surveys have reported growing concern about the safety and healthfulness of the food supply. The Packer's Fresh Trends 1988 consumer survey found that 83 percent of the respondents were concerned about chemical residues on produce (Vance Publishing, 1989). The Food Marketing Institute's (FMI) 1989 Trends report found that 82 percent of the respondents felt that residues on food were a serious hazard, ranking residues as their greatest food safety concern.

Yet the limitations of consumer survey methodology compel caution in interpreting these findings. The same FMI survey mentioned above asked consumers about their food safety concerns in an open-ended format (i.e. without prompting on the specific concerns). In response, consumers identified spoilage and germs as the number one food safety concern, placing residues in fourth priority. Further, when consumers were asked whether they were confident that the food in their supermarket was safe, 81 percent responded affirmatively. This would indicate that while consumers may be concerned in a general sense, this concern does not outweigh an underlying confidence in the system.

The Packer Fresh Trends survey would support this conclusion. Sixty four percent of the respondents said that while they were concerned, they had not changed their buying habits. However, 18 percent had modified their buying practices, primarily in two ways. Eight per cent

had purchased organically grown fresh fruits and vegetables and nine percent had sought out fresh produce merchandised as pesticide or residue free.

Consumer Demand for Organics

While consumer interest in organically grown commodities has expanded significantly, it is still a niche market. Although the precise size of this market segment has not been determined, some interesting observations can be made. A 1987 consumer survey conducted in California by Jolly et al., provides information about consumer purchases of organic produce. However, the survey findings should not be construed as representative of the California population. The highly educated, European-American distribution of the respondents would tend to indicate that the findings may overestimate consumer interest in organics. While a whopping 62 percent of the respondents had purchased some type of organic food product in the past, only three percent described themselves as high users of organics. Of those consumers who reported having purchased organically grown products, 82 percent described themselves as low to occasional users. Important purchasing constraints were noted by 74 percent of the respondents, namely the high price and limited accessibility of organics. Quality considerations were not a significant constraint for most of the respondents.

The experience of growers and retailers in marketing organic produce also sheds light on consumer behavior. Until recently organic products were primarily produced by small growers unable to meet the chain store requirements of large volume, consistent quality packs. Organic products were mainly distributed through health food stores, consumer food cooperatives and farmers markets. It has been hypothesized that if organic products were commonly available in (convenient) supermarkets, significantly more consumers would purchase organics.

Recent developments have begun to make organic products more readily accessible. Several large scale grower-shippers in California (frequently motivated by price premiums for organics) now produce organic products in large enough quantities to sell directly to chains. For their part, many retailers have experimented with organic produce since the Alar publicity in February of 1989. Yet preliminary interviews by the author with chain store personnel indicate mixed results at best. While interest in organics surged during the Alar publicity, it quickly subsided. Numerous chains have eliminated their experimental organic sections due to weak sales.

This is consistent with the reports of many growers with large organic acreages, who continue to sell much of their product on the conventional market due to inadequate consumer demand for organics. For example, a large scale organic grape grower markets only 30 to 40 percent of his crop on the organic market, even in the current climate of increased consumer interest. Prior to 1989 a mere three percent of his crop could be moved on the organic market.

While the organic production industry in California has expanded dramatically, it is estimated to account for only two percent of California's production of horticultural commodities and \$100 million in farmgate sales. There are an estimated 1300 to 1500 organic growers, again less than two percent of the total population of California growers. Despite the general expansion of the organic industry, there is some evidence that the supply of some organic products may be increasing at a more rapid rate than demand. Typically, agricultural producers, perceiving potential profits in a new market, can easily saturate the market.

Based on the limited market place evidence available to date, the segment purchasing organic fruits and vegetables as a high percentage of their total fresh produce purchases is estimated to be less than three percent of national consumers.

Hence, although 20 percent of U.S. consumers are classified by Pillsbury (for market segmentation purposes) as health-conscious, this trait does not necessarily translate into demand for organics. Many members of this segment are primarily concerned with the nutritional attributes of food.

Alternative Food Safety Labels

As was noted earlier, the Fresh Trends survey found that nine percent of consumers had purchased produce merchandised as residue free. Residue free marketing strategies are being experimented with by both retailers and grower-shippers. Many programs are not necessarily residue free labels, but rather, "tested for residues." One of the most well known private residue testing programs is NutriClean, utilized by several retailers in California and nationally. Retailers contract with NutriClean for the testing service but the samples are actually analyzed by independent private labs. In contrast to the wide coverage of commodities (over 200) and pesticides (over 100) captured by government monitoring programs, NutriClean's routine dock sampling program involves only nine commodities tested for 14 pesticide residues. Since NutriClean is in addition to the sampling already done by the government and is so limited in scope, many believe that the advertising claims of participating retailers are misleading. The apparent implication of some retailers' claim is that while their products are tested (the number tested is not specified), products available in other supermarkets are not.

The food safety-oriented strategies of California grower-shippers are also worth noting, since California supplies the U.S. with half of our fresh produce. California firms have launched a plethora of labels, including Probiotic, Naturite, Primus, Pesticide Free, and No Spray. Yet interviews with retailers and shippers marketing this type of product shows mixed results. While it is too early to form definite conclusions, preliminary interviews indicate that price premiums are generally not obtained for this type of label. Handlers mention several problems with these labels. For example, it is difficult for retailers to manage different price levels for the same commodity, and the definition or meaning of many labels is unclear and confusing to both retailers and consumers. Many handlers theorize that those consumers sufficiently motivated to change their buying behavior may demand the organic option.

Still, some shippers feel that food safety-oriented labels may yield a competitive edge, for example, strengthening their sales in a long market. This perceived advantage could conceivably become less notable in the future, however, given the high percentage of California shippers that have launched some type of food safety-oriented label in recent months.

Shippers complain that while retailers are requesting further assurances about the safety of their products and increasingly about growing practices, retailers frequently have very limited understanding of the information shippers provide. On the other hand, the array of food safety-oriented labels being marketed appears to be sending mixed and confusing signals to both retailers and consumers. The question arises, are firms providing useful information to consumers (i.e., adding value to their products), or are they simply adding costs which increase the price of food without any clear benefit to consumers? Further, the regulatory system may be ill equipped to respond to the explosion in labels, providing the opportunity for the communication of misinformation.

Regulation of Organic and Other Non-conventional Produce

Among agencies of the federal government, there is no recognized definition of "organic," or any other such term as applied to agricultural commodities, including produce. Federal inspection of produce - be it identified as no spray, organic or any other term - is conducted as part of the Food and Drug Administration's (FDA) routine sampling program for illegal pesticide residues. The federal view holds that because pesticide usage is stringently monitored by federal and state government agencies, produce does not exceed federal pesticide residue limits, regardless of how it is grown or labeled.

This position is supported by federal and state residue sampling results. For the fiscal year ending September 30, 1987, the Food and Drug Administration reports that less than one percent of the fresh foods tested exceeded federal tolerance levels. The State of California residue sampling program consistently finds that only about .3 percent of the samples taken have residues in excess of the federal tolerance. Indeed, California has the largest state pesticide monitoring program in the country and consistently finds that approximately 80 percent of the samples have no detected residues. In other words, most conventionally grown products are residue free, even though they are not marketed as such. Most of the residues that are detected are less than half of the federal tolerance.

FDA does investigate label fraud, such as products intentionally mislabeled as organic, no spray or pesticide free. But since FDA does not operate with any legal definition of organic or other food safety-oriented labels, investigations are handled on a case-by-case basis.

Consumer Advocacy Groups

Powerful consumer advocacy groups have emerged in recent years. Many evolved as environmental rather than food safety related interest groups. These groups have been concerned about agricultural pesticide usage for environmental reasons. Over time they have discovered that linking pesticide usage in agriculture to food safety is an effective tool for stimulating greater public concern and legislative action. It is easier for people to relate to something which they feel may harm them personally, as opposed to a more abstract issue.

The handling of the Alar issue this winter by the Natural Resources Defense Council (NRDC) is a case in point. NRDC hired Fenton Communications, a public relations agency, to orchestrate the campaign against Alar usage on apples (Wall Street Journal). It is interesting to speculate on the motivation for choosing Alar. Alar is a relatively obscure chemical used on less than five percent of the U.S. apple crop, a single commodity. It has not been identified as a carcinogen in laboratory animals, much less in humans. Hence, why Alar? NRDC was apparently advised by its public relations firm to focus on something affecting children, making it even more of an emotional and personal issue. Participation by the actress Meryl Streep was also reported by Fenton to be an essential element of the strategy.

According to Fenton, one of the purposes of the campaign was to generate substantial, immediate revenue for NRDC (Wall Street Journal). While NRDC is a non-profit organization it still is a business and like any other business it must generate income in order to cover expenses and prosper. It behooves us to recognize that advocacy groups have an incentive to create concern and fear. Without concern, people do not contribute to these groups or in other words, buy their product.

Since the NRDC/FENTON successful publicity blitz, the manufacturer of Alar, Uniroyal, has voluntarily pulled the product off the market in the U.S. Although numerous scientific authorities reassured the public on the safety of apples, there are several instructive lessons learned from this case. Uniroyal points out that: people are confused by a scientific debate in public; consumers and the media do not understand pesticides, nor do they understand risk; any pesticide residue is perceived as a hazard; and the level of media exposure is viewed as the barometer of the level of seriousness for the consumer (Produce Marketing Association).

The Food Marketing Institute offers some information on the effect of the double whammy of Alar and the Chilean grape scare on consumer attitudes about food safety. The Food Marketing Institute 1989 Trends survey mentioned earlier was carried out in January 1989. FMI re-surveyed its sample in April 1989, after the Alar publicity, to determine whether there was a statistically significant change in consumer confidence in the safety of food purchased in the supermarket. The consumer confidence level was down from 81 percent of the respondents in January to 67 percent on April 14, only partially recuperating to 73 percent on April 28. This would indicate that consumer confidence can be measurably eroded by a public controversy. Because it takes time to restore public confidence, a series of shocks could have a permanent effect. On the other hand, some experts hypothesize that information overload may occur, desensitizing consumers to food safety concerns.

Consumer Advocate Allegations and the Scientific Response

Consumer advocates maintain that there are several threats posed to public health by agricultural pesticides. The principal arguments of the advocates are: 1) any synthetic pesticide residue poses a potential public health threat; 2) possible adverse health consequences may result from long term exposure to low levels of various pesticides; 3) the government regulatory system does not adequately take into account the affects of pesticides on children; 4) processed and fresh foods are subject to different regulatory standards for carcinogens; and 5) the government permits known carcinogens in the food supply.

The complexity of the food safety issue does not permit a complete treatment of these issues in this paper. However, the response of scientists to these allegations will be briefly summarized. First, extensive scientific evidence indicates that humans are exposed to synthetic residues at extremely low levels. Most products we consume do not have detectable residues. Secondly, low level exposure to trace amounts of synthetic pesticide residues is not believed to pose a health hazard to humans. Life expectancy has continued to rise in the U.S. since WWII. Further, per capita cancer rates have been stable or declining for all forms of cancer except lung cancer (due to smoking) and melanoma (due to too much sun), both primarily caused by clear and avoidable risks which people willingly incur.

For many years FDA has conducted a Total Diet Study to measure residues actually present on table-ready foods. The Total Diet Study exposure estimates are compared with Acceptable Daily Intakes (ADIs) to estimate the risks of pesticides in the diet for various population subgroups. This analysis shows that exposures rarely exceed one percent of the ADIs. Even for the 6 to 11 month-old subgroup, estimated exposures are still far below the ADIs. Since a 100-fold safety factor is built into the ADIs, actual human exposure generally represents a dose 10,000 times lower than the highest dose shown to cause no observable toxic effect in the most sensitive experimental animal species studied (Archibald and Winter).

Different safety standards do exist for processed and fresh foods. The Delaney amendment to the Food and Drug Act establishes a zero risk level for carcinogens in processed

foods. In contrast, the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA) regulates pesticide residues on raw agricultural commodities, and FIFRA employs a risk/benefit analysis which balances the risk from pesticides with the economic benefits. While these differing safety standards may create confusion and efforts are being made to harmonize them, this does not imply that public health is impaired by a regulatory inconsistency.

Finally, known carcinogens are permitted for use in the production of agricultural commodities when the potential levels of human exposure are not deemed to represent a health hazard. Contrary to popular belief, carcinogens are ubiquitous in our food supply and always have been. The vast majority of carcinogens (as well as toxins in general) are naturally occurring, rather than synthetic. Approximately half of all chemicals tested, be they synthetic or naturally occurring, have been shown to be carcinogens. However, scientists tell us not to worry, since our bodies have evolved over the centuries with natural defense mechanisms to ward off toxins (Tierney). Again, they reiterate that we are living longer and healthier lives today than ever before.

In response, consumer advocates indicate that if there is any risk or doubt, "keep it out." This argument assumes the impossible, that risk can be completely eliminated. Further, it assumes that no costs would be associated with the elimination of pesticide usage. In reality, abundant evidence exists to indicate that consumer health would be worse-off since pesticides significantly reduce microbial contamination, and help to keep in check the production of potentially very harmful natural toxins.

In conclusion, the scientific consensus is that synthetic pesticide residues pose an insignificant risk to public health. The food safety priorities identified by FDA, in declining order of priority are: 1) microbial contamination, 2) nutritional imbalance, 3) environmental contaminants (e.g., lead, mercury), 4) natural toxins, 5) pesticide residues, and 6) food additives.

Implications for the Fresh Produce Industry

Consumers are receiving confusing and conflicting messages about food safety. Consumer advocates continue to call into question the safety of food, including produce. Yet the U.S. Surgeon General, National Cancer Institute, American Heart Association, and the American Cancer Society all tell consumers that fruits and vegetables can lower the risk of cancer and heart disease, as part of a high-fiber, low-fat diet.

Growers and retailers, for their part, publicly support government regulatory programs. Where problems exist they indicate that government programs should be modified and strengthened. Yet in an effort to restore public confidence, many growers and retailers are developing their own food safety labels and information programs (of course, gaining a strategic marketing advantage relative to competitors in the process would not be unwelcome).

Given the difficulty mentioned earlier of defining and regulating these emerging food safety labels, the produce industry itself may be contributing to public misinformation and confusion. Surveys show that retailers are being relied on by more consumers to represent their interests and provide information on food safety. This position of trust should not be taken lightly. To the extent that retailers can present science-based, consistent information to consumers, the industry as a whole should be well served.

The produce industry has established the Center for Produce Quality (CPQ) as a vehicle for communicating accurate food safety information to retailers and ultimately consumers. The

CPQ should be supported and used by the industry. "Wildcat" approaches to food safety for the purpose of individual strategic advantage may only create confusion and alarm, to the detriment of all, including consumers.

Despite consumer concerns, most consumers still appear to feel that the food industry warrants their confidence. Further steps should be taken, where appropriate, to address legitimate concerns regarding our regulatory system, enhancing safety for all. Industry participants should be encouraged to support national harmonization of food safety standards and increased funding to strengthen federal regulation. This should reduce the current tendency of many states to develop their own standards, adding further confusion in the market place.

Organic consumption is increasing but is still a much more limited market than current media publicity might indicate. Again, harmonization is needed to ensure a national standard governing the production and marketing of organic produce.

In conclusion, if consumers receive a consistent, balanced message about the relative risks and benefits of fresh produce consumption, consumer interest should remain strong. In order to convey a clear message, the produce industry itself must first become better informed on the science of food safety.

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OUTLOOK FOR COTTON

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Since the U.S. cotton industry has operated under the auspices of the 1985 Food Security Act, it has proven to be an exciting time for those who follow world cotton developments. Although world production has varied between almost 71 million and 84 million bales, world consumption has exceeded world production each year resulting in carryover supplies being reduced from 45.5 million bales to 31 million last August. A further reduction in stocks is expected by the end of this season, and if realized, will yield the lowest stocks-to-use ratio since World War II.

World consumption has increased the past 3 years from almost 83 million bales in the 1986/87 marketing year to over 84 million and is expected to reach a record 86 million bales this season. Increased world consumption has raised world trade in raw cotton to record levels. Nearly 26 million bales were shipped internationally in 2 of the past 3 years. The U.S. has participated in world cotton trade during the past 3 years, reclaiming a more "normal" share of world exports (table 1).

During this time period, the cotton industry has had to manage a tremendous amount of price volatility. As measured by the Northern Europe Cotlook "A" Index, prices fell below 37 cents per pound in early August of 1986, rose to almost 88 cents 12 months later, then declined to 55 cents in August of 1988, and, at the present time, are trading in the low 80 cent range. With the outlook pointing to a very tight stock situation and the uncertainty of production, consumption, and trade, the potential for extreme price fluctuations will continue.

Outlook for 1989/90

U.S. Production and Consumption

In the U.S. during crop years 1987 and 1988, cotton production exceeded use resulting in increasing stock levels. In 1989, smaller planted acreage and larger abandonment have reduced crop

prospects from the past 2 years. In addition, competitive U.S. prices, strong foreign and domestic mill usage, and low foreign stocks are expected to boost domestic consumption and U.S. exports resulting in a significant drop in U.S. carryover. Currently, 1989 U.S. cotton production is forecast at 12.1 million bales. Upland production is estimated at 11.4 million bales and extra-long staple at a record 668,000 bales.

Domestic mill use is expected to increase for the fifth consecutive year. Last season, U.S. mills used more cotton than at any time since 1971/72. Increased mill consumption during the last half of the 1988/89 marketing year was related to stronger apparel and accessory sales, especially denim and active sportswear items, and lower textile inventories. Apparel sales have continued strong this season and consumers' preference for natural fibers is expected to increase use in 1989/90. U.S. cotton consumption is forecast at 8.2 million bales this season.

Consumption on a seasonally adjusted annual rate for August, September, and October averaged 8.5 million bales. During September, the consumption rate exceeded 8.7 million bales, the largest in over 2 decades. Similarly, cotton's share of fibers used on the cotton system represented over 70 percent of the total during the first 3 months of the 1989/90 marketing year.

Increased consumption this season is expected despite higher cotton prices. Cotton delivered to Group B mills reached 87 cents per pound in October, compared with 93 cents for polyester. However, since manmade fiber supplies remain fairly tight, the substitution of polyester for cotton in blends may be limited.

Domestic mill use is expected to increase despite rising imports of foreign textiles. Imports are forecast to reach nearly 2.3 billion pounds, almost at the record set in 1987. Although gains in textile exports also are expected, the textile trade deficit may approach 4 million bale-equivalents and represent nearly 40 percent of U.S. cotton mill consumption in 1989.

Foreign Production and Consumption

Following weather-reduced crops in many of the major producing countries in 1986, production rebounded and ranged between 66 to almost 69 million bales. Foreign production in 1989/90 is estimated at 68.5 million bales. China's production is projected at 19.5 million bales, 400,000 bales above last season's crop but below expected consumption. The Soviet crop is estimated to be 1.2 million bales less than last year's. However, prospects for larger production have improved for Pakistan and India. The Pakistani crop is forecast at a record 7.1 million bales, nearly 500,000 more than in 1988/89. Indian production is projected up more than 400,000 bales to 8.7 million, the second highest record. In addition, all the main Southern Hemisphere producers (Brazil, Australia, Paraguay, and Argentina), which account for about 10

percent of world production, are expected to achieve large production gains this season.

While foreign production has increased, demand has remained high. Projected at 77.8 million bales, foreign consumption in 1989/90 is expected to reach its sixth consecutive record. On balance, consumption by importing countries is projected to rise by about 1 percent and consumption by exporting countries by nearly 2.5 percent.

The combined cotton use of Japan, Taiwan, and Hong Kong is forecast to fall 265,000 bales. However, consumption growth in South Korea and among the newly emerging cotton importers--Thailand, Indonesia, and the Philippines, will nearly offset this decline. Western Europe also expects a small recovery in textile demand from last season. Consumption in Pakistan, India, China, Brazil, Turkey, Egypt, and Mexico continues rising as it has in recent seasons. These countries are forecast to increase their combined use by more than 1.1 million bales this season, largely due to population and income growth.

With consumption still substantially above production, ending stocks are expected to tighten further in 1989/90, falling from 23.9 million bales to 22.2 million. The foreign stocks-to-use ratio is expected to drop to only 28 percent.

World and U.S. Cotton Trade

From 1986 to 1988, record world trade resulted from increased demand for cotton. World trade rose above 25 million bales for the first time in 1986 and is projected to remain there this year. However, major foreign exporters' shipments are expected to decline from 13 million to 10 million bales this season because of higher domestic consumption and lower exportable supplies.

U.S. cotton exports are forecast to reach 7.8 million bales in 1989/90, the largest amount since the 1979/80 season. U.S. export shares to our major markets also are expected to rise this season. Higher market shares are likely in the Pacific Rim textile-producing countries and in Western Europe. In addition, China is expected to be a net importer of cotton this season. China's imports are forecast to reach 1.5 million bales. As of mid-November, China has booked over 400,000 bales of U.S. cotton for delivery during the 1989/90 marketing year. As a result, the U.S. share of global trade is projected at 31 percent, well up from last year's 24 percent.

Competitive U.S. prices and recent changes in the upland cotton program are two reasons for increased U.S. exports. Memphis territory quotations for 1989-crop cotton were included in the A index between March and mid-June. However, between June and mid-September, Memphis cotton was not one of the lowest five quotes offered on the Northern European market. Since September, with the

exception of one day in October, U.S. cotton has been one of the five lowest quotes.

On October 3, 1989, several changes in the upland cotton program became effective. The regulations for determining the prevailing world market price for upland cotton, adjusted to U.S. quality and location (adjusted world price), were amended to authorize an additional adjustment in the adjusted world price whenever:

- o the formula-derived adjusted world price is less than 115 percent of the current crop year's loan-level for strict low middling 1-1/16 inch, micronaire 3.5 through 4.9 cotton; and
- o the Friday through Thursday average price quotation for the lowest-priced U.S. growth as quoted for middling (M) 1-3/32 inch cotton c.i.f. (cost, insurance, and freight) Northern Europe is greater than the Friday through Thursday average price quotation for the five lowest-priced growths as quoted for M 1-3/32 inch cotton c.i.f. Northern Europe (Northern European price).

The amount of the additional adjustment may not exceed the difference between the Friday through Thursday average price quotation for the lowest-priced U.S. growth quoted for M 1-3/32 inch cotton c.i.f. Northern Europe and Northern European price. In determining the actual amount of any adjustment, USDA will consider the projected U.S. share of world exports, the current level of export sales and/or export shipments, and any other relevant data. While these changes were made to insure U.S. competitiveness, world prices have been significantly above the loan level and the additional adjustment has not been implemented.

Outlook for 1990/91

Although many uncertainties surround the world outlook for 1990/91, current economic conditions and policies suggest an expansion of world cotton area and production. Given that yields are highly variable, world production could range from 85 to 90 million bales.

U.S. Production

The early season outlook for the U.S. points to significantly larger upland cotton acreage and production. This increase is based on 1990 upland cotton program provisions. The new program will not differ significantly from the current one. However, producers will be required to reduce their cotton acreage by 12.5 percent of their base (25 percent was required in 1989) to be eligible for target price protection and the Commodity Credit

Corporation (CCC) loan program. A paid land diversion program will not be implemented.

Specifics for the 1990-crop program include a target price of 72.9 cents per pound, with a loan level of 50.27 cents for base quality upland cotton--strict low middling (SLM) 1-1/16 inch micronaire 3.5 through 4.9, at average U.S. location. In addition, if the AWP for cotton falls below the announced loan rate, the Plan B marketing loan program will be put into effect. Under Plan B, 1990 crop cotton pledged as collateral for a price support loan may be repaid at the lower of the AWP or the loan level.

If a price support loan is extended for 8 months, the producer will be required to pay interest and warehouse storage charges on cash loan repayments during the loan extension period regardless of the level of the AWP. As in 1989, if the loan collateral is forfeited to the CCC, the producer will be required to pay CCC all costs associated with the storage of the forfeited cotton, beginning with the first month of the loan extension and a handling fee of \$1 per bale on the forfeited cotton.

USDA also announced that a recourse loan program for upland seed cotton will continue. The signup period for the program will begin January 16 and end April 13, 1990. During signup, producers may request 40 percent of their estimated deficiency payments.

Program enrollment in 1990/91 will likely approach this year's 89 percent participation rate, despite an improved supply and demand situation. If the lower acreage reduction program (ARP) entices nearly 90 percent participation, upland planted acreage could increase to between 12 and 13 million acres, with as much as 2 million acres planted outside the program. The 1990 crop could range from 13.5 to 16.5 million bales. If trend yields are realized, the upland crop could exceed 15 million bales, almost 4 million bales above the projected 1989 crop.

The outlook for American Pima production is significantly different from the U.S. upland outlook. The Secretary of Agriculture is expected to announce major provisions of the 1990 ELS cotton program by December 1, 1989. Notwithstanding the 1990 program provisions, lower prices and burgeoning stocks will likely dominate the 1990/91 ELS outlook.

In 1990/91, ELS planted area could shrink by as much as 100,000-150,000 acres from its current-season record to less than 250,000 acres. Many producers may elect to plant upland cotton in lieu of ELS since higher upland prices and lower ELS prices in 1989 have made upland cotton production more attractive.

Assuming trend yields and normal abandonment, 1990/91 ELS cotton production could range from 400,000 to 450,000 bales. With current-year ending stocks estimated at about 220,000 bales, total ELS supplies in 1990/91 could range from 625,000 to 675,000 bales--below the current season, but still at historically high levels.

Foreign Production

Tight world supplies and continued high prices will likely result in increased foreign acreage and production in 1990/91. Major producing countries such as China, Pakistan, India, and Australia, are likely to increase production through expanded acreage. In addition, larger acreage and a recovery in yields in the Soviet Union may increase production. If prices remain near current expectations, Southern Hemisphere producing countries are likely to further expand production. Assuming "normal" yields, foreign production could range between 70-75 million bales.

U.S. Consumption

Domestic consumption in the U.S. should remain strong again next season. Competitive cotton prices relative to manmade fibers and the continuation of consumers' preference for natural fibers contribute to this consumption. Although domestic mill use may not match this season's expected use of 8.2 million bales, consumption should still top 7.5 million bales. Several factors could lead to slightly lower consumption next season. Some of these factors include: higher cotton prices this season; the possibility of a downturn in apparel and accessory sales, especially denim and active sportswear; the cyclical nature of the textile industry; and the continuing impact of textile imports.

Foreign Consumption

If growth in population and income continue to follow recent trends and cotton prices remain in line with manmade fibers, foreign cotton consumption could exceed 75 million bales for the fifth consecutive year. However, higher cotton prices this season are likely to limit the growth in foreign consumption rates in 1990/91. Consumption may continue to increase among cotton producing countries and the emerging textile producing importers in Southeast Asia. However, intensifying competition from these textile producers may lower consumption in Japan, Western Europe, Taiwan, South Korea, and Hong Kong. Barring a prolonged slowdown in economic activity and more restrictive trade agreements from textile importers, foreign cotton consumption could remain near this season's record level.

U.S. and Foreign Stocks

With larger production prospects both in the U.S. and abroad, and overall slightly lower consumption, stocks will likely rise at the end of the 1990/91 marketing year. In the U.S., ending stocks may total 4 to 5 million bales, slightly above the target level specified in the 1985 Food Security Act. Foreign stocks also could

increase by over 2 million bales. Even with these increased stocks, world supplies are expected to remain fairly tight.

World Trade

World cotton trade in 1990/91 will depend on the level of consumption in importing countries as well as the availability of supplies in exporting countries. Historically, imports account for nearly 30 percent of foreign use. Assuming no major slowdown in foreign economic activity, import demand for cotton may drop only slightly next season. Although foreign production will likely increase, the current tight foreign stock situation and recent changes in the upland cotton program to improve competitiveness may support U.S. exports. U.S. exports could range between 6 and 7 million bales during the 1990/91 marketing year, dropping back to a more normal share of world trade, while foreign exports are likely to increase.

Beyond 1990

An objective of the Food Security Act of 1985 was to make U.S. cotton competitive in the world market. The success of this Act is varied. One of the successes of the Act has been the reduction of cotton stocks to more acceptable levels. Carryover supplies at the end of 1985/86 were over 230 percent of the normal level compared with a predicted 83 percent at the end of this season. Burdensome stock levels have also been reduced for the majority of other program crops.

The marketing loan program worked well in 1986/87 although there have been times when U.S. cotton was not competitive while the program was in effect. A number of changes aimed at improving the effectiveness of the program have been made by USDA in cooperation with the cotton industry. These changes primarily affect the way in which the AWP is calculated, the payment of storage and interest, and the operation of the extended loan option. These changes were made with the aim of moving U.S. cotton into export and domestic markets rather than keeping it under loan. Enhancing the price competitiveness of U.S. cotton remains a key objective for the next farm bill if the U.S. is to continue as a major factor in world production and trade.

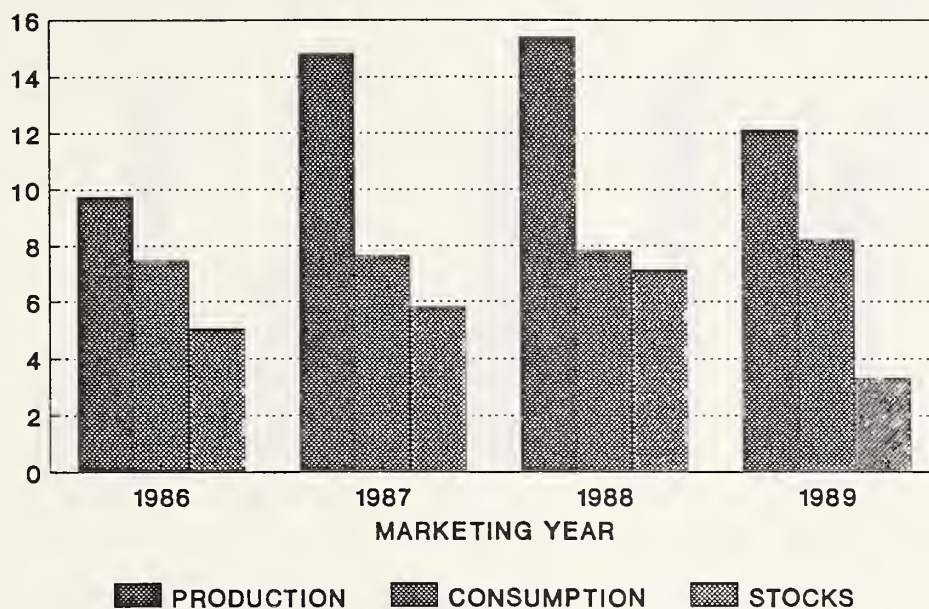
If the U.S. is to attain a market share between 25 and 30 percent of world trade, U.S. cotton prices should not diverge from foreign prices by more than 3 or 4 cents per pound. This prediction is based on relationships between U.S. and foreign cotton prices and U.S. export market shares during the past 20 years. The ability of the next farm legislation to maintain competitiveness as well as a balance between production and use will determine the future direction of the U.S. cotton industry.

Table 1--World cotton supply and distribution, 1985/86-1989/90

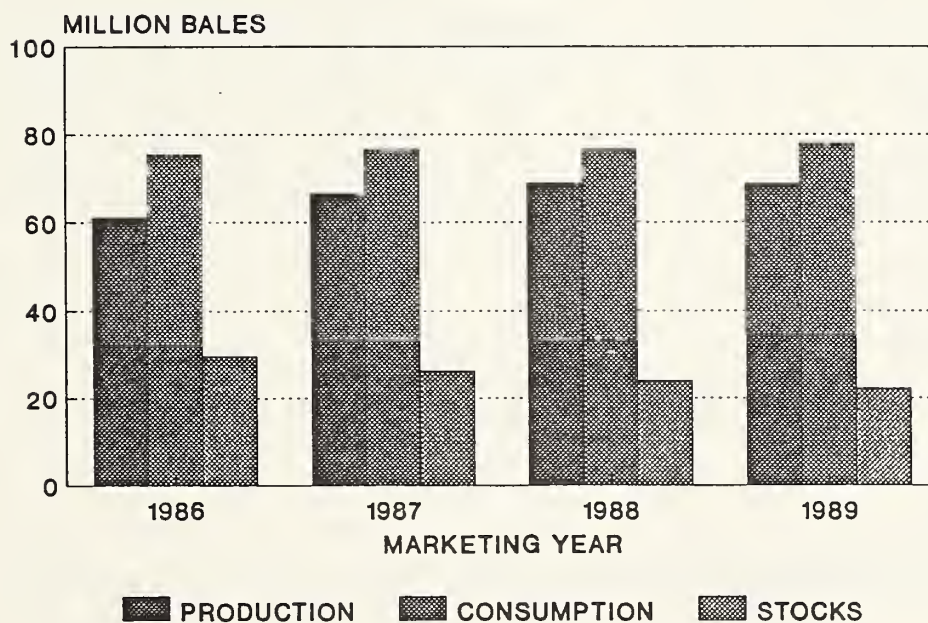
Countries	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
-----Million bales-----						
Beginning stocks:						
World	42.4	45.5	34.7	32.0	31.0	25.4
U.S.	4.1	9.4	5.0	5.8	7.1	3.3
Foreign	38.3	36.1	29.7	26.2	23.9	22.1
USSR	1.5	2.3	2.0	1.2	1.4	1.1
PRC	20.1	16.8	9.8	6.6	6.0	6.0
Pakistan	1.1	.9	1.1	1.7	.4	.7
Other Exporters	10.0	10.5	9.6	9.7	9.8	8.0
Importers	5.6	5.6	7.2	7.0	6.3	6.3
Production:						
World	79.4	70.7	81.0	84.1	80.6	
U.S.	13.4	9.7	14.8	15.4	12.1	
Foreign	66.0	61.0	66.2	68.7	68.5	
USSR	12.8	12.2	11.3	12.7	11.5	
PRC	19.0	16.3	19.5	19.1	19.5	
Pakistan	5.7	6.1	6.8	6.6	7.1	
Other Exporters	26.2	23.8	26.0	27.3	27.5	
Importers	2.3	2.6	2.6	3.0	2.9	
Imports:						
World/Foreign	21.6	25.7	23.7	25.6	25.4	
USSR	.6	.4	.4	.3	.4	
PRC	1/	1/	.1	1.8	1.5	
Other Exporters	.9	1.2	1.1	1.2	1.3	
Importers	20.1	24.1	22.2	22.3	22.2	
Consumption:						
World	77.8	82.7	84.0	84.3	86.0	
U.S.	6.4	7.5	7.6	7.8	8.2	
Foreign	71.4	75.2	76.4	76.5	77.8	
USSR	9.4	9.4	9.0	9.1	9.0	
PRC	19.5	20.2	20.5	19.8	20.0	
Pakistan	2.5	3.0	3.6	3.9	4.3	
Other Exporters	18.4	18.6	19.2	19.6	20.2	
Importers	21.6	24.0	24.1	24.1	24.3	
Exports:						
World	19.9	25.9	23.1	25.9	25.2	
U.S.	2.0	6.7	6.6	6.2	7.8	
Foreign	17.9	19.3	16.5	19.7	17.4	
USSR	3.2	3.5	3.5	3.7	3.2	
PRC	2.8	3.2	2.3	1.7	1.0	
Pakistan	3.1	2.9	2.4	3.8	2.4	
Other Exporters	8.1	8.6	7.4	9.2	9.5	
Importers	.7	1.1	.9	1.3	1.3	

1/ Less than 50,000 bales.

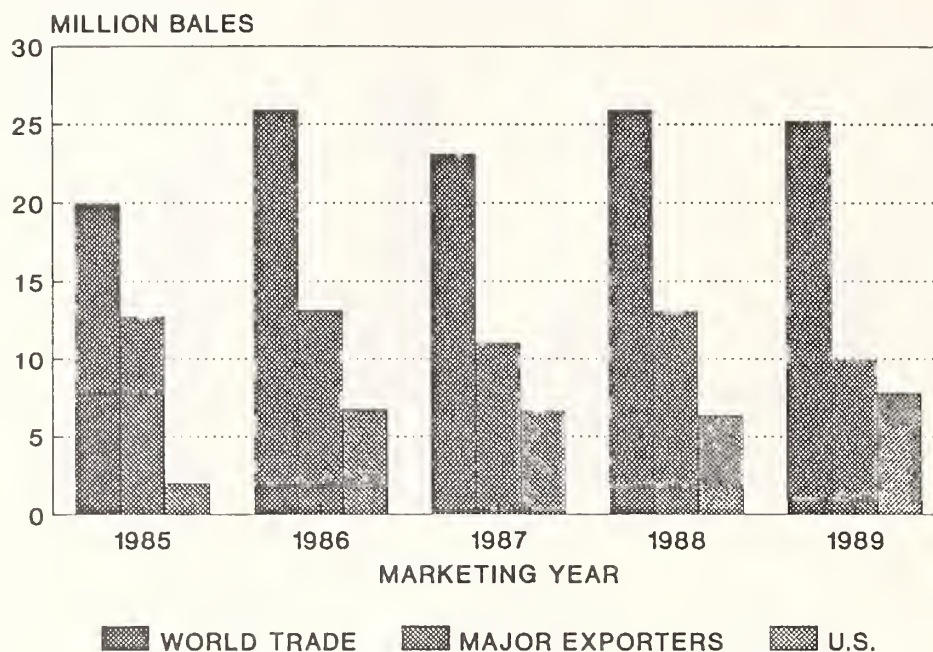
U.S. COTTON PRODUCTION, CONSUMPTION AND STOCKS



FOREIGN PRODUCTION, CONSUMPTION AND STOCKS



WORLD AND U.S. COTTON TRADE

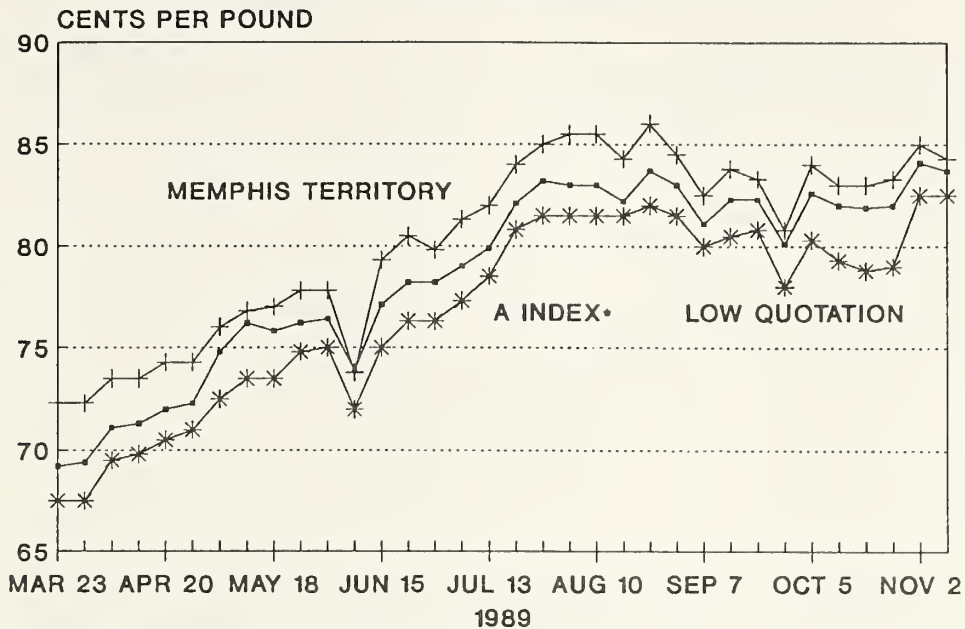


U.S. COTTON EXPORT SHARES TO SELECTED COUNTRIES

COUNTRY	1986/87	1987/88	1988/89	1989/90 1/
-----PERCENT-----				
JAPAN	56	47	42	50
KOREA	77	76	63	67
TAIWAN	56	57	18	26
HONG KONG	5	7	10	12
ITALY	20	27	16	25
FRANCE	15	9	2	5
GERMANY	23	33	19	29
PORTUGAL	11	7	3	6
INDONESIA	43	35	34	33
THAILAND	24	20	14	17
CHINA	0	0	52	60
WORLD	26	28	24	31

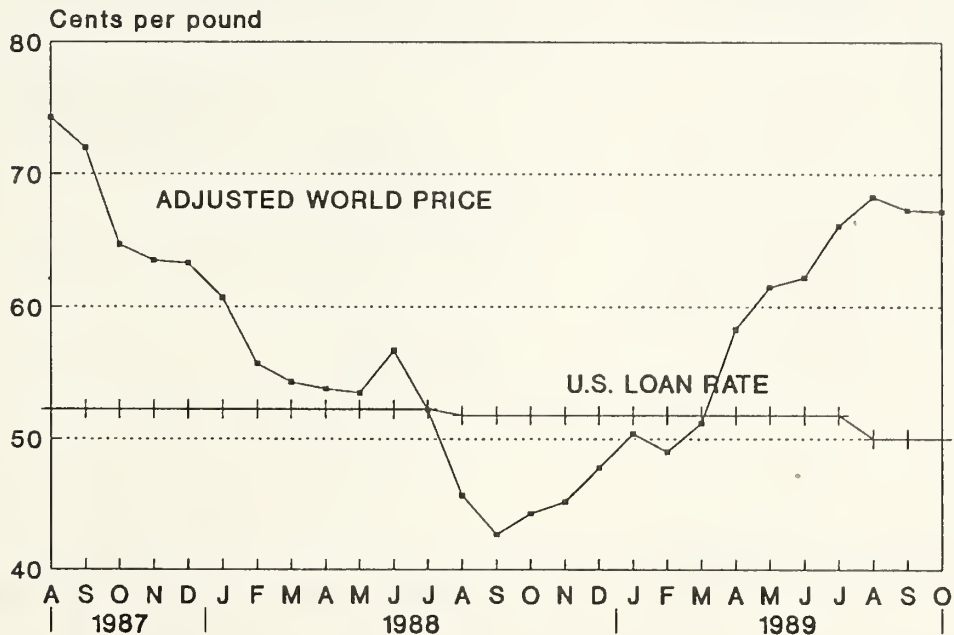
1/BASED ON ESTIMATES AS OF NOVEMBER 9, 1989.

U.S. AND FOREIGN 1989-CROP COTTON PRICES

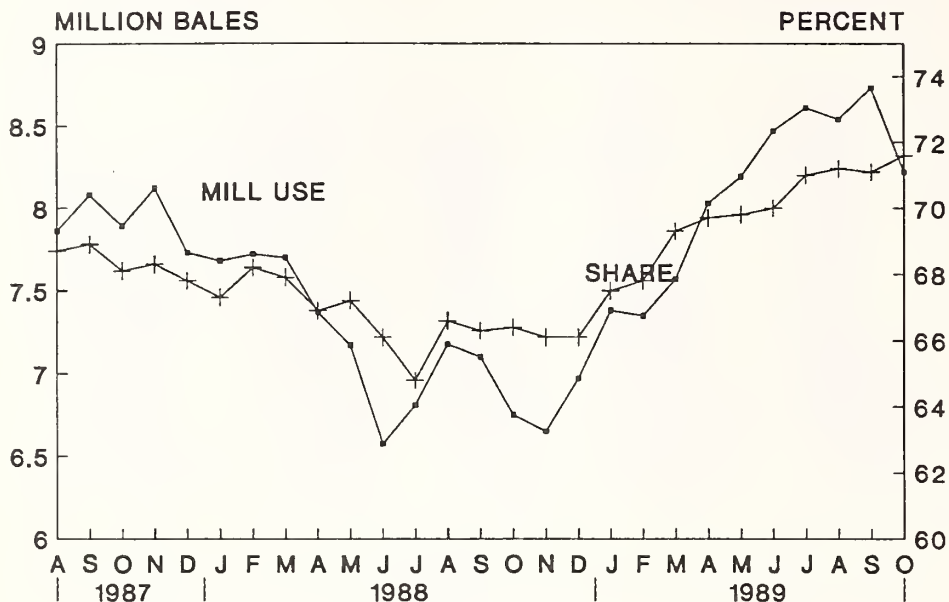


• AVERAGE OF THE CHEAPEST FIVE TYPES OF
M 1-3/32 INCH STAPLE LENGTH OFFERED ON
THE EUROPEAN MARKET.

ADJUSTED WORLD PRICE AND U.S. COTTON LOAN RATE

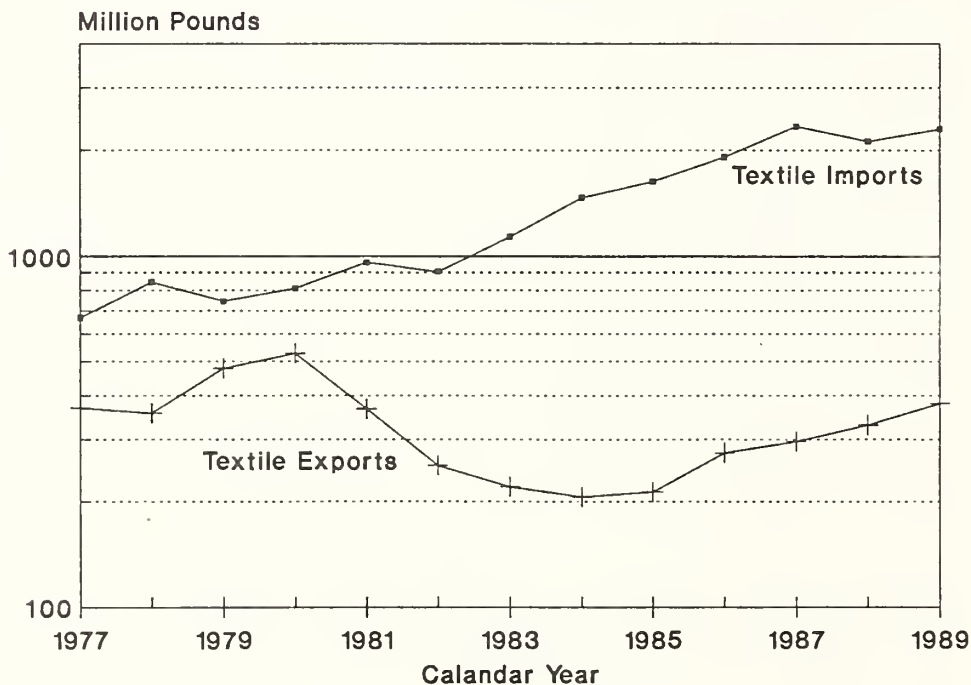


DOMESTIC MILL USE AND SHARE OF FIBERS USED ON COTTON SYSTEM



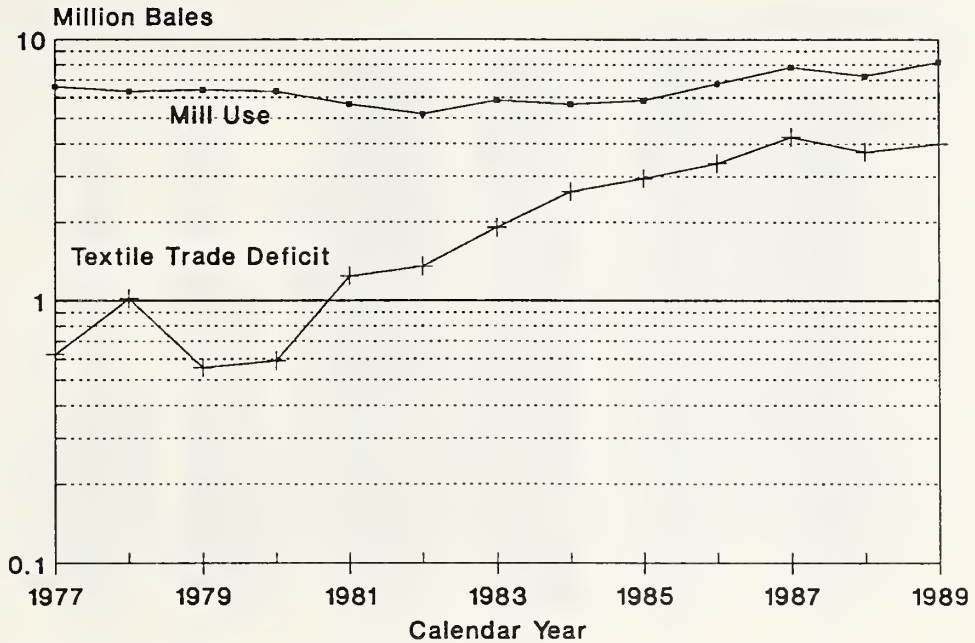
MILL USE IS THE SEASONALLY ADJUSTED ANNUAL RATE.

U.S. Cotton Textile Trade 1/



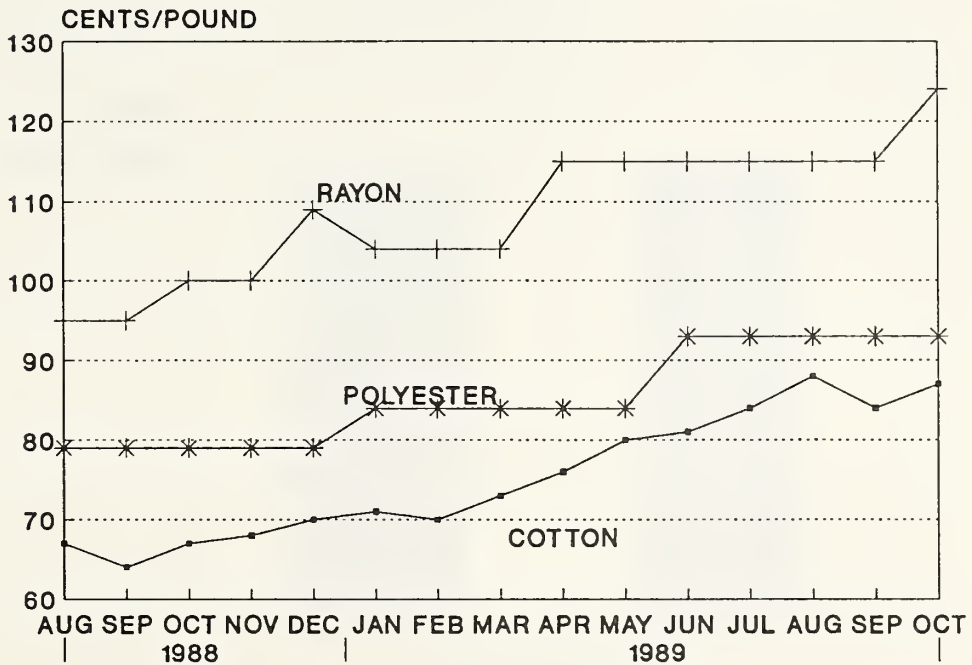
1/ Raw Fiber Equivalent Basis.

Cotton Textile Trade Deficit and Domestic Mill Use



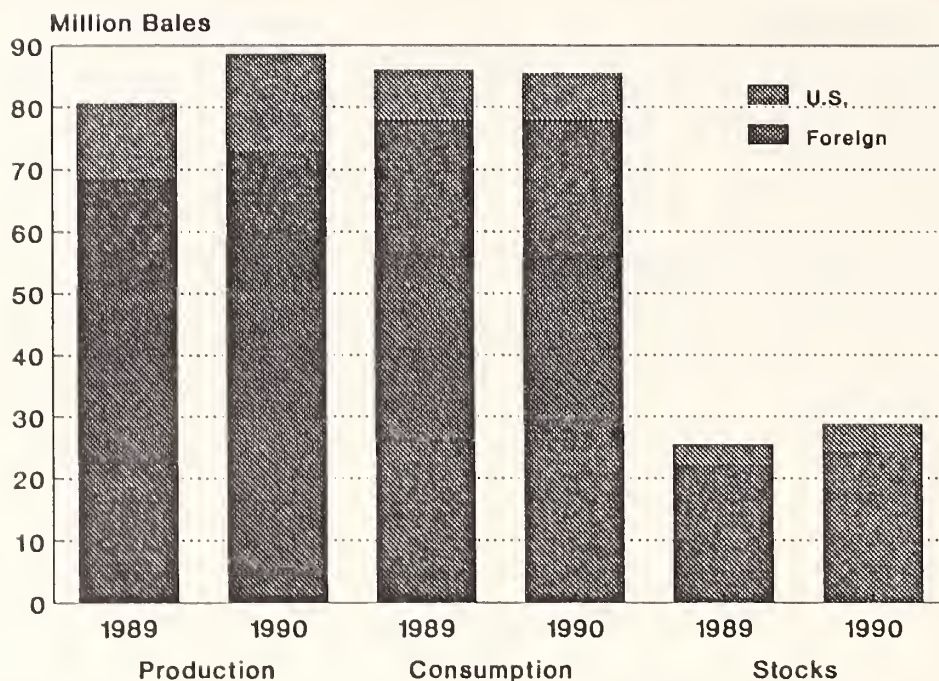
1/ Raw Fiber Equivalent Basis.

U.S. FIBER PRICES 1/

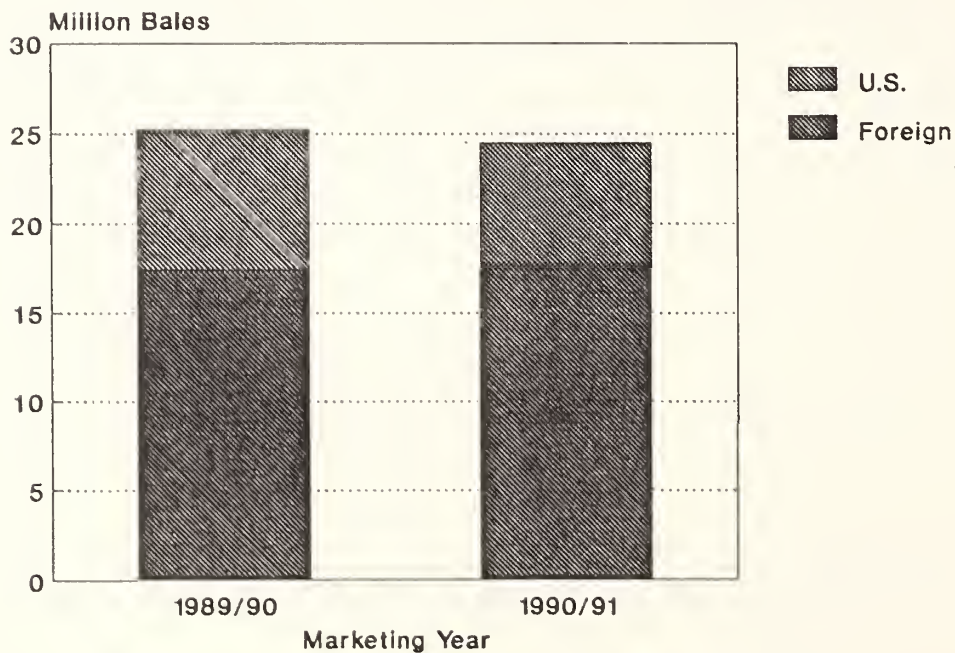


1/ RAW FIBER EQUIVALENT BASIS.

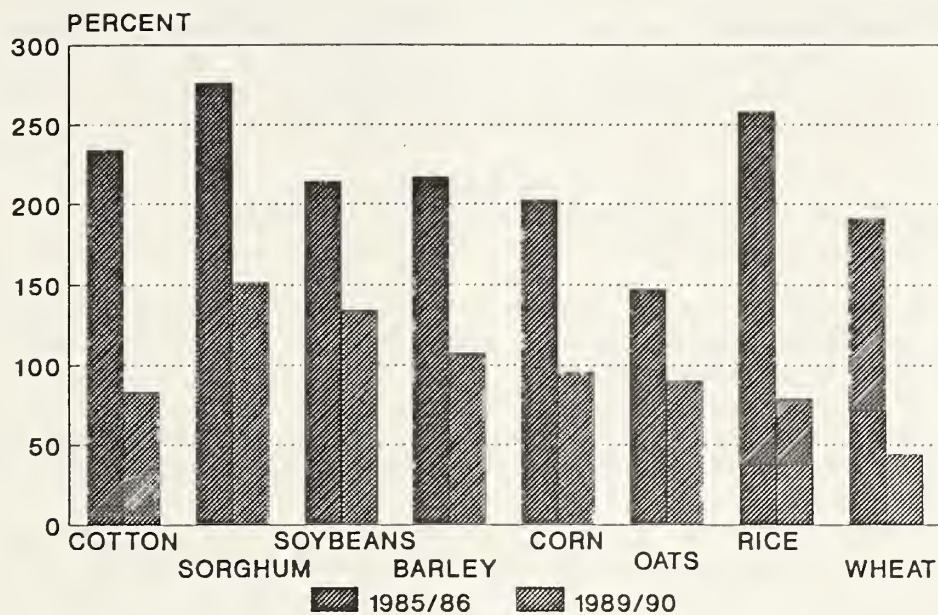
FOREIGN AND U.S. PRODUCTION, CONSUMPTION AND STOCK PROJECTIONS



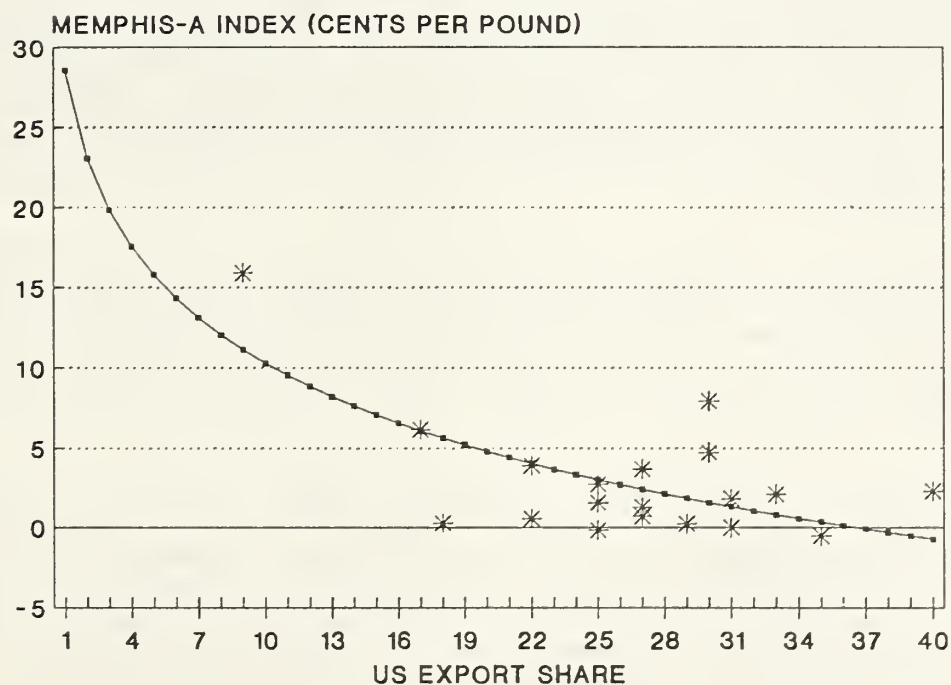
Foreign and U.S. Export Projections



CARRYOVER STOCKS AS PERCENT OF FSA TARGET OR 'NORMAL'



U.S. PRICE COMPETITIVENESS



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.



Outlook '90, Session #16

For Release: Wednesday, November 29, 1989

COTTON LEGISLATIVE UPDATE

John Maguire
Vice President, Washington Operations

Thank you, Mr. Chairman. I am pleased to participate in today's program. On behalf of the National Cotton Council, thank you for your support and your strong involvement in cotton issues.

Before we discuss new farm legislation, let's briefly review the current economic situation, recent changes in the cotton program and the 1990 program provisions.

The November crop report reconfirmed that the global and domestic stocks-to-use ratios will reach the lowest levels since World War II. Global ending stocks are projected to be 25 million bales, down 6 million bales from last year. This equates to a stocks/use ratio below 30 percent. World consumption, which has increased for the last three years, is expected to increase to a record 86 million bales. World production is projected to reach 81 million bales, 4 percent below last year.

Total U.S. production is projected to reach 12.1 million bales. Upland cotton production is expected to be 11.4 million bales. Domestic mill use continues strong at 8.2 million bales - the highest in nearly 20 years. Exports are expected to reach 7.8 million bales - the highest level since 1979/80. A 12 million bale crop with a 16 million bale off-take will result in a dramatic decline in carryover stocks to 3.3 million bales - a dangerously low 21 percent of off-take.

This market situation served as a back-drop when Secretary Yeutter recently announced provisions of the 1990 cotton program. The target price will be 72.9 cents per pound and the base loan rate will increase slightly to 50.27 cents per pound. The provision which proved to be most controversial in the industry and the Administration was the acreage reduction which was set at 12-1/2 percent.

Certain provisions of the recently passed Budget Reconciliation Act will result in slight modifications to the 1990 crop target price and loan rate. To meet budget requirements, all 1990 crop deficiency payments will be reduced. The reduction for cotton will be 0.515 cents per pound. The adjustment will probably be made in the advance deficiency payments. Also, at the last minute, Congress included a provision requiring all 1990 expenditures be reduced by an amount which would produce real savings of about \$14 billion. In the case of agriculture programs, there will be a mini-sequestration. All cash program benefits will be reduced by about 1.4 percent. Details will be available before sign-up begins.

On October 3, several changes in the upland cotton program became effective. The regulations for determining the prevailing world market price for upland cotton were amended to authorize an additional adjustment by the Secretary. Whenever the adjusted world price is less than 115 percent of the loan, the Secretary may adjust the world price by a specific amount to ensure U.S. cotton is competitive in world markets. Also, a new rule requires the redeemer to pay storage and interest charges which accrued during the 8 month loan extension, regardless of the level of the adjusted world price. If cotton is forfeited, the owner must pay 8 months accrued carrying charges plus a fee of \$1.00 per bale.

Now let's review the outlook for 1990 farm legislation. My comments are a compendium of best guesses and opinions - not a statement of Council or industry policy.

While, it is too early to make definitive statements about the ultimate contents of the 1990 farm bill, we can identify a number of factors that will shape the new legislation. Those who have followed previous farm bills know that the process is heavily influenced by current events and market conditions. The 1981 bill was developed during a period of rapid inflation, and reflected the expectation that world prices and demand would remain strong. The 1985 legislation was developed during a period of financial stress, crop surpluses, and declining share of world trade.

In 1985 there was prolonged debate on the merits of strict supply management versus decoupling of benefits from actual production. Ultimately, the Congress sought middle-ground. Target prices were slowly ratcheted-down, grain loan rates were moved to a formula basis similar to cotton, an export enhancement program was created, and a marketing loan was authorized for cotton and rice. The acreage reduction authority, and base and yield provisions primarily responded to budget restraints. When combined with a new modified-cross-compliance requirement, they also reflected concern about surplus production. The addition of 50/92, later revised to 0/92 for grain, and a long-term acreage retirement program (known as the conservation reserve) rounded-out a farm bill designed to be budget responsible, eliminate surplus stocks, provide stable farm income, and reclaim world market share.

As we begin the 1990 debate, there is an absence of extreme views. It appears that most farm groups, with the possible exception of dairy and soybeans, favor an extension of the principle's embodied in the 1985 Food Security Act...with some fine-tuning. The primary factors that will determine the ultimate provisions of new legislation include: the multi-lateral trade negotiations (GATT), the budget deficit, environmental concerns, and an interest - among some groups - in more cropping flexibility and program simplicity. A number of other issues will be addressed including: payment limitations; targeting of program benefits to small farms; adjustments to the crop insurance program; continued use of generic certificates; renewal of the Targeted Export Assistance Program and Export Enhancement Program; adjustments to the PL-480 and GSM credit guarantee programs; expansion or renewal of the CRP; and, adjustments to the sodbuster and swampbuster provisions. Depending on progress made on other legislation, there may also be new provisions on producer funded promotion programs, rural development, and the environment.

Cotton is particularly interested in having Congress authorize a referendum to amend our research and promotion program. Hopefully, that will be completed prior to the farm bill.

Since the Uruguay Round of GATT negotiations is scheduled to be near completion by late 1990, there will be spillover from those negotiations to the farm bill debate and vice-versa. The future of U.S. export programs - especially the EEP and the marketing loan - will be affected by progress in the GATT negotiations, and the response of other nations to a proposal to eliminate export subsidies. Most commodity groups and members of Congress contend that a strong export title will best serve U.S. interests during the negotiations and protect U.S. agriculture during any transition period necessitated by new agreements.

The U.S. GATT proposal also calls for gradual elimination of "market-distorting" domestic programs. This would appear to lead to a form of decoupling and a low, "safety-net" loan level. A renewed discussion of "de-coupling", combined with the debate on "flexibility" and program costs, could trigger serious consideration of legislative changes which go well beyond fine-tuning.

During the debate on 1990 legislation, the budget deficit will be a major factor since the Gramm-Rudman-Hollings deficit target for Fiscal 1991 is \$64 billion and the current deficit projection is well over \$100 billion. Our inability to accurately forecast agricultural program spending, combined with continuing pressure to reduce the deficit, could push the Budget Committee to establish a fixed level of spending authority for agriculture. That approach would be custom-made for proponents of decoupling or the triple-base concept since both allow control over the acreage eligible for payments resulting in more easily predictable costs. A total cap would make it extremely difficult to add new programs unless others are cut. Unfortunately, urban members of Congress like the capped spending approach.

Certainly, no discussion of 1990 can ignore the interest in cropping flexibility. Obviously, this issue can create divisions across regions and commodity interests. Just before the recess, Senators Leahy and Lugar introduced legislation which would authorize creation of a farm acreage base within which any program crop could be planted. The legislation was purposefully vague on a number of issues so as to serve as a discussion piece. Interestingly, the provisions include decoupling by basing program benefits on the historical base and yield rather than actual crop production. While attractive on the surface, most flexibility proposals create a number of concerns, especially among producers who have one principal cash crop and where the propensity to over-produce is relatively strong. The farm acreage base concepts limit the effectiveness of traditional supply management techniques and can result in virtually unlimited budget exposure, unless decoupling is adopted. If the objective of flexibility provisions is to allow producers to plant for the market, Congress may be forced to re-balance benefits between crops. This would ensure acreage shifts respond to market signals not to any imbalance between program benefits. Cropping flexibility and program simplicity are desirable and achievable, but the debate could spawn some undesired side-effects if not backed by careful analysis.

It is interesting to note that Senator Pryor has suggested a flexibility program which would allow limited base shifts between crops, eliminate cross-compliance, provide a permanent 10/25 oilseed program and allow overplanting of permitted acreage in return for reduced target price coverage. This proposal should receive careful consideration since it would seem to fit southern agriculture's needs.

In reviewing the development of new farm law, it is clear that GATT, the budget deficit, environmental interests and cropping flexibility will stimulate dynamic debate. Simple fine-tuning of the 1985 farm legislation to create the 1990 farm bill will be a difficult assignment. Also, we are making projections without knowing the Administration's position on the issues and without detailed analysis of the political climate. For example, we cannot lose sight of the fact that members of the Senate Agriculture Committee from Arkansas, Alabama and Mississippi face re-election campaigns. And, the Chairman of the Committee has already indicated his strong interest in environmental issues. On the plus-side, it is fortunate that Senator Pryor chairs the subcommittee that will write the commodity programs.

Although it will not directly impact loan rates, target prices or determine the future of the marketing loan, we must acknowledge the role environmental interests will play in future farm legislation. The 1985 farm bill set a precedent by linking compliance with sodbuster and swampbuster regulations to eligibility for program benefits. That linkage could be carried a step further in 1990 by imposing certain recordkeeping provisions on chemical usage, requiring well testing or even requiring a groundwater management plan to be eligible for program benefits. There is unfinished business associated with the CRP including questions about expansion, renewal of contracts and utilization of land when contracts expire. Certainly, there will be debate on conservation compliance, sodbuster, swampbuster, the need to make program for farmers who employ Low Input practices and FIFRA amendments to respond to food safety concerns.

After considering factors which will influence the overall debate, we can consider the cotton title and specific common program provisions.

Fortunately, cotton program costs are projected to be significantly lower in Fiscal 1990 and 1991. Consequently, the industry and Congress can focus on the need to protect farm income and provide competitively priced cotton on a continual basis. But, the resultant policy does not significantly increase costs.

These fundamental objectives will lead to spirited debate. Our domestic mill customers are genuinely concerned about short supplies and the availability of good quality cotton at prices comparable to those paid by their overseas competitors. Merchants want access to a sufficient volume of cotton for delivery at a competitive price to domestic and international customers. Producers appreciate the need for adequate supplies, competitive prices, and good quality; but, they do not want to risk a return to burdensome surplus stocks and depressed farm income.

The industry is generally supportive of the marketing loan concept, a formula based loan rate, the target price concept and the recent modifications to the adjusted world price formula implemented by the Secretary. However, there will be discussion about the terms and duration of the loan, linkage of acreage reduction levels to specific carryover levels, possible changes in the triggered import quota, and the need to mandate certain adjustments in the world price formula.

The debate on flexibility will have an impact on the cotton program. Currently, a majority of producer interests support provisions in current law authorizing a limited shift between crop acreage bases. They also favor elimination of the modified cross-compliance authority. There may be support for a crop specific flexibility provision; but, producers oppose Normal Crop Acreage, decoupling and triple-base proposals at this time.

You should be aware that a blue-ribbon panel of cotton industry representatives, appointed by the Secretary, are working to develop recommendations on a number of key issues including: addition of certain quality factors to the loan schedule, mandatory HVI classing and a revision of Section 403 concerning calculation of the loan premiums and discounts. The Committee recommendations could be included in the cotton title of the 1990 legislation.

In addition to the program provisions relating to the fiber component, we may have to develop legislative provisions for cottonseed. Our crushing industry has suffered significant losses in recent years, due mainly to the loss of traditional export markets to subsidized competition. The Export Enhancement Program and a special export program, COAP, have been unused by the Administration because competition is South and Central American debtor countries rather than the EC. The need for special legislative provisions could also result from any major alteration to the soybean program or other oilseed programs, or if certain flexibility provisions are adopted.

Clearly, the 1990 farm legislation will involve the most dynamic and complex debate in history. While the general preference will be for stability, a combination of factors may result in more than simple fine-tuning. It should be noted that regardless of the provisions of legislation designed in 1990, we may have to revisit the legislation in 1991 if a GATT agreement is reached requiring significant reform in trade or domestic agricultural policy. Debate on the '90 Farm Bill will start in earnest as soon as Congress returns. Chairman Huckaby has scheduled hearings on cotton for January and February. Chairman de la Garza wants the individual titles reported by April 1. On the Senate-side, Senator Pryor will probably schedule hearings on cotton in February and the Committee will begin writing legislation in March. Ultimately, we should have a bill prior to the November elections.

Certainly we have the ingredients for a year full of challenges. Never has it been more important for our cotton industry and the agriculture community to be united in order to accomplish our objectives.

Again, thank you for the opportunity to visit with you this afternoon. I look forward to welcoming you to Washington for the Council's 52nd annual meeting in February.



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.

Outlook '90, Session #16 For Release: Wednesday, November 29, 1989

COTTON OUTLOOK FOR 1989/90 AND 1990/91

Dewell R. Gandy
Vice President Economics, Dunavant Enterprises, Inc.

RESPONSE TO SUPPLY/DEMAND OUTLOOK FOR 1989/90 AND 1990/91 ON COTTON

In examination of U.S. and world numbers for 1989/90, I am in basic agreement; however, I would like to make several key observations.

U.S. Production - I feel that final production will end up closer to 11.85 million bales mainly due to the greater impact of the freeze damage to the crops in Texas and Oklahoma.

U.S. Consumption - I would agree that the 8.2 million bale projection looks good.

U.S. Exports - I feel that 7.8 million bales may prove to be too large. I am looking at 7.5 million bales which is associated with a lower Texas type cotton production number. If Southern hemisphere crops begin to look more optimistic and PRC needs are not as large as expected, then 7.5 million bales may be questionable. If we run into problems with Southern hemisphere crops then 7.8 may be attainable.

World Production - I feel that 80.0 million bales may be closer to the final world crop with PRC being the major downward adjustment. There will be minor adjustments down in Egypt and Turkey offset by increases in Argentina but PRC has suffered weather problems with drought affecting acreage and crops in Shandong, Hebei, Shaanxi, Sichuan, Hunan and Jiangxi. The question is just how much below 19.0 million bales is the crop.

World Consumption - I feel that world consumption at 86 million is too high mainly because of problems with slow-downs and lack of raw materials at many PRC mills. Their consumption could be close to 1 million bales lower than reflected in the USDA numbers. Also Taiwan and South Korea combined could be over $\frac{1}{2}$ million bales lower than reflected due to dramatic pull backs in Taiwan business and slow-downs in yarn business for South Korea.

In examination of U.S. and world projections for 1990/91, I would be in very close agreement with the USDA projections. Again several key observations should be made.

U.S. Production - Using a $12\frac{1}{2}\%$ ARP and looking at a favorable relationship of cotton prices relative to other competing crops, we should expect over 12 million acres planted and a crop around 15.5 million bales.

Stocks - The projection of stocks increasing by a little over a million bales to $4\frac{1}{2}$ million helps build stocks back to a more comfortable level but by no means excessive. Although I feel domestic consumption trends will stay stronger than USDA projections, exports may be under by a similar amount, thus we still net out to the same ending stock level.

World Supply-Demand Numbers - When I look at world production on a country by country basis, I have a hard time generating a production number over 88.0 million bales. This is assuming a strong acreage response in PRC that would yield a 21.0 million bale crop and a reduced acreage in USSR based on ecological concerns but higher yields that would yield a 12+ million bale crop. I would expect the Southern hemisphere countries to be looking at less attractive cotton prices than the Northern hemisphere countries and thus anticipate lower production numbers. One word of caution should be mentioned. As we approach plantings of Northern hemisphere crops this year, prices should be much more sensitive to crop problems that develop early on and not really decline until we are assured the 1990 crop is in the ground and growing properly. With demand at essentially the same level projected by USDA (85.5) world ending stocks should increase by $2\frac{1}{2}$ million bales. Again, remember that a little over 1 million of this stock increase is located in the U.S., thus foreign stock levels will be more comfortable but definitely not excessive.

1990 COTTON PROGRAM POLICY

In considering adjustments to the 1985 Act, the following principles should guide us for 1990 Cotton Program Policy -

1. U.S. cotton must be competitive in world markets.
2. Program costs must be minimized within the framework of the first objective.
3. Neither the level of the price support loan nor its duration should interfere with the orderly marketing of cotton.
4. Production should be determined by supply and demand forces.

More specifically we should keep as a central theme the marketing loan concept of the 1985 Act. There are several adjustments that USDA has made recently to the 1985 Act that should become permanent in any new legislation.

First, the policy of waiving carry charges when AWP is below the loan and not accessing fully, storage and interest when AWP is above the loan until the point where AWP exceeds the loan level plus accrued storage and interest charges should be maintained for competitive purposes.

Second, the authority to adjust the formula-derived AWP whenever U.S. cotton is not competitive in world markets will permit U.S. cotton prices to adjust more quickly to changes in world prices and make the market loan approach more effective. This adjustment should allow us to stay competitive in world markets and keep competitive prices for our domestic textile mills.

Third, the requirement for payment of both storage and interest costs on cash loan repayments during the loan extension period, regardless of the level of AWP, should discourage loan extensions and promote more timely loan repayments. Assessment of 8 months of storage costs and the \$1 per bale handling fee on forfeited cotton should make forfeiture of loan collateral less attractive. Either this approach or an outright 10 month loan with no extension should be a must in new farm program legislation under the market loan concept.

The price support loan policy should be reconsidered. Under a marketing loan concept the level of the loan needs to be at a level that does not interfere with orderly marketing. Economic theory suggests that producers will continue to produce in the short run as long as they cover variable cost of production. Maybe we should consider basing the loan level on some moving average of the variable cost of production.

The target price policy should be considered the primary means of income protection and should be established at a level equal to total economic cost of production as determined by USDA. Again, this could be based on some type of moving average to smooth out the ups and downs year to year.

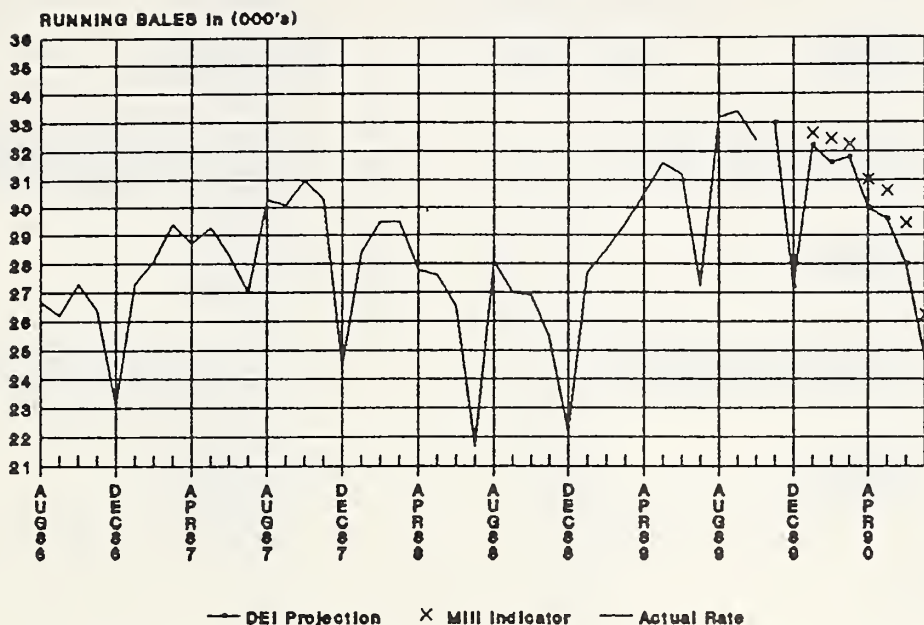
The CCC resale policy under a market loan needs to be reconsidered. CCC owned cotton should be cataloged as soon as forfeited and sold every other week pursuant to sealed competitive bids with a reclass and reweight at the option of the buyer. The minimum acceptable bid should be 105% of the loan rate or the AWP, whichever is lower.

Flexibility of planting decisions in response to market signals should be a consideration in future legislation provided that such approaches do not increase program cost.

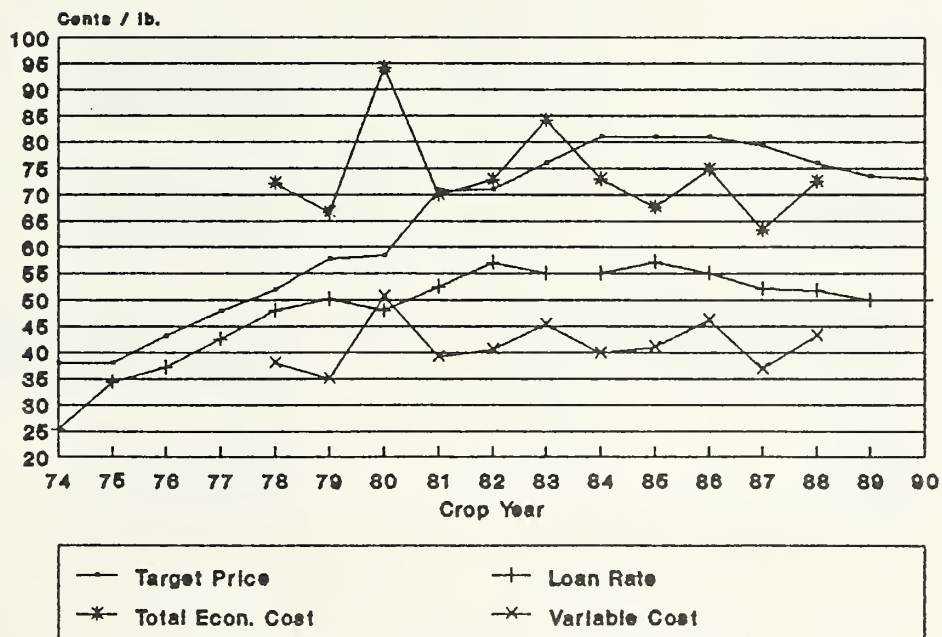
One final point for consideration should be on the annual program announcement date. Maybe we need to move the date from November 1 to a later date to allow USDA access to better knowledge on the US crop and world conditions before making program decisions. Consideration of coarse would have to be accorded the early production areas where a later announcement may adversely affect farm management decisions.

These are some of the key points for consideration in any new cotton marketing loan legislation for the 90's that will have to be fleshed out and agreed upon.

U.S. MILL CONSUMPTION RAW DAILY RATE IN RUNNING BALES



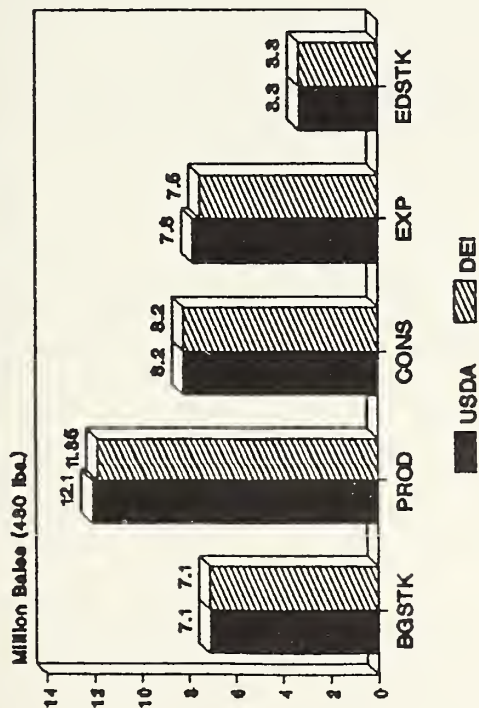
TARGET PRICE, LOAN RATE & COSTS OF PROD. For U.S. Cotton 1974 to 1990



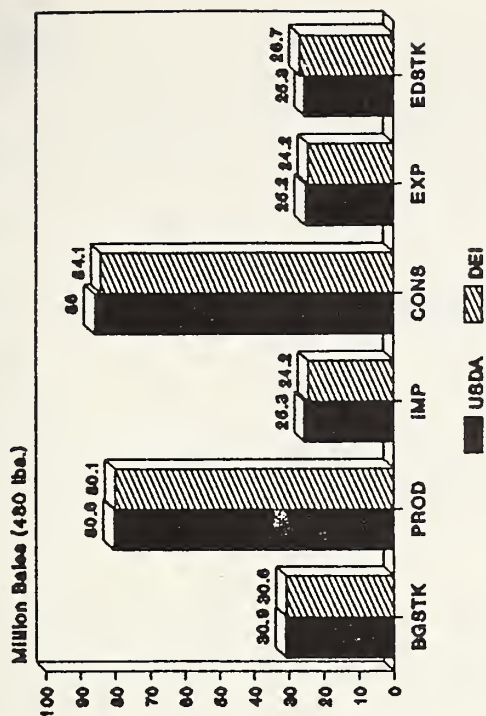
Source: Costs of Production, USDA/ERS

	TO DATE EXPORT SALES COMMITMENT	1989 PROJ. EXPORT	% COMMITTED OF PROJECTED
W. EUROPE	955.0	1234	77%
E. EUROPE	107.0	400	27%
AFRICA & MID-EAST	152.0	290	52%
S & C AMERICA	65.0	125	52%
CANADA	74.0	200	37%
PRC	396.2	700	57%
JAPAN	1129.0	1440	78%
S. KOREA	935.0	1400	67%
TAIWAN	135.0	214	63%
OTHER ASIA	685.0	1080	63%
	<u>4740</u>	<u>7100</u>	<u>67%</u>

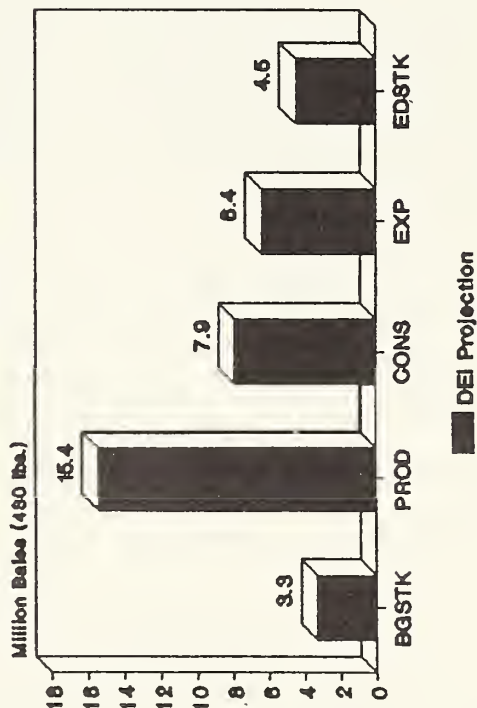
U.S. ESTIMATES FOR 1989/90



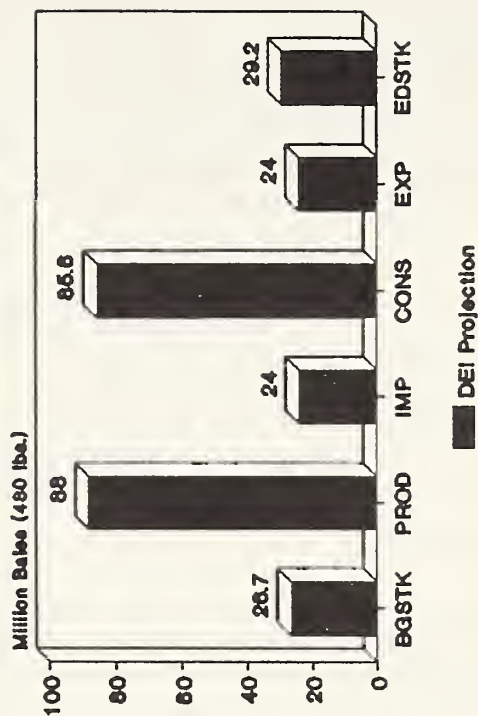
WORLD ESTIMATES FOR 1989/90



U.S. ESTIMATES FOR 1990/91



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URBAN AND RURAL HOUSEHOLDS: ECONOMIC STATUS OVER TIME AND CURRENT STATUS BY SELECTED CHARACTERISTICS

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The economic status of American households has been the subject of much discussion in recent years. There have been studies that examined how trends in household economic status vary by certain characteristics such as race or age. However, one characteristic that has not been fully addressed is whether a family resides in an urban or rural area. Because different economic conditions have prevailed in the two areas over the past decades, this study will examine how households in each locale have fared economically. Although economic status has typically been assessed by income alone, the expenditures of households, which reflect another aspect of economic status, will also be examined. The second part of the study will analyze the present economic status of urban versus rural households by family type, race, and age. This should give a more complete understanding of the differences in economic status between urban and rural households.

Data and Analysis

Data used in this study are from the interview components of the Consumer Expenditure Surveys for the years 1960/61, 1972/73, and 1985. All surveys collected information on the characteristics, income, and expenditures of households. A national probability sample of households was interviewed for each survey. Data for all periods are weighted to reflect the U.S. population at the time. The design methodology of the surveys changed over the years. Beginning in 1980, consumer units were interviewed over 5 quarters. Since then the survey has been continuous. From these quarterly data, annual expenses can be calculated.

All income data are based on households who were complete income reporters. To examine the economic status of households over time, adjustments were made due to variations in income and expenditure classification among the surveys by following procedures outlined in the survey documentation (11, 12). Income and expenditure data were converted into real or constant 1985 dollars using the Consumer Price Index for All Urban Consumers (CPI-U). Although the

Consumer Price Index for All Urban Consumers, Experimental Measure 1 (CPI-U-X1) is regarded to be a better measure of living cost changes because it does not pick up the investment aspects of homeownership, this index has only been calculated since 1967 so does not exist for the 1960/61 period. However, the percentage difference between the two indexes has been less than 10% since 1967, the CPI-U being higher, so use of the CPI-U does not severely bias the results.

Economic Status of Urban and Rural Households Over Time

During all three time periods, average after-tax income of urban households was from 17% to 41% higher than that of rural households (table 1). Killian found this urban-rural earnings difference reflected both the characteristics of each labor market (i.e., the urban labor market contains a greater proportion of higher paid occupations) and the characteristics of workers in each labor market (i.e., the rural market has a lower proportion of more highly educated workers) (5). After-tax income increased in real terms for both urban and rural households over the 1960/61 to 1985 period. This increase was higher for rural than urban households (18% versus 10%), thereby narrowing the income gap between the two groups of households. Per capita income of urban and rural families also increased over this time as average household size remained constant for urban households (3 members) and declined for rural households (from 4 to 3 members). It should be noted that Social Security deductions were not withheld from after-tax income. Therefore, because Social Security increased over the period, excluding it from after-tax income would reduce the growth observed.

Although the real after-tax income of urban and rural households increased between 1960/61 and 1985, this growth actually occurred entirely in the 1960/61 to 1972/73 period. From 1960/61 to 1972/73, real after-tax income of urban households increased 16% and that of rural households, 40%. This increase occurred despite a rise in the income tax obligation of both groups of households over this time (from 12% to 15% of before-tax income for urban households and from 7% to 13% of before-tax income for rural households). From 1972/73 to 1985, real after-tax income of urban and rural households fell. The percentage decrease was higher for rural than urban households (-15% versus -5%). The decline in real after-tax income would have been greater had not the income tax obligation of these households also declined over this time (from 15% to 9% of before-tax income for urban households and from 13% to 9% of before-tax income for rural households).

Causes for observed income trends were both similar and different for urban and rural households. In both household groups the entrance of a wife/mother in the labor force contributed to higher real income over the 1960/61 to 1985 period. Since husband/wife households accounted for the majority of all households during this time, this would have a large impact on overall household income. The labor force participation rate of all married women grew from 31% in 1960 to 54% in 1985 (10). This growth was especially pronounced for women in rural areas. During the 1970's, the increase in the

labor force participation rate of farm women was nearly three times that of their nonfarm counterparts (9). Although women entered the workforce in large numbers during the decade, many worked part time; therefore, the growth in real income was lower than might otherwise be expected.

Various economic and social factors led to a decrease in real income for urban and rural households over the 1972/73 to 1985 period. The farm crisis of the early 1980's and its spillover effects in the nonurban economy contributed to the real income decline of rural households. Over the 1980-86 period farm numbers dropped by approximately 300,000 as a result of foreclosure or voluntary exits due to financial difficulties (3). The shift in jobs from manufacturing to services contributed to the real income decline of urban households; service sector jobs, on average, pay lower wages than those in the manufacturing sector. In 1959 service industries accounted for 49% of all hours of employment, whereas in 1984, this percentage had increased to 72% (6).

Social factors that affected real income trends include the growth in the number of single-parent families, who typically have a much lower income than husband/wife families. Such households comprised 11% of all households with children in 1970, but 22% of all households with children in 1985 (10). The number of households headed by an elderly person and single-person households, who also have lower incomes on average, also grew over this time. The growth in these segments of the population as a proportion of all households diluted average real income for households overall.

Average total expenditures in real terms generally followed the same pattern as income. Real total expenditures were higher for urban than for rural households in each of the three time periods. During the 1960/61 to 1985 period, total expenditures in real terms increased 7% for urban households and 31% for rural households, thereby narrowing the expenditure gap between the two groups of households over time. As with income, this growth was concentrated in the years 1960/61 to 1972/73 as real expenditures declined from 1972/73 to 1985 for both urban and rural families.

Housing and transportation accounted for a large proportion of the increase in total expenditures for both household groups. Expenditures on housing (rent or mortgage interest and property taxes; repair and maintenance of a home; utilities; water and sewerage; furnishings and equipment; and insurance) made up the largest share of total expenditures for urban and rural households in all three time periods. As a budgetary share, housing expenditures steadily increased over time. For urban households, housing increased from 29% of total expenditures in 1960/61 to 34% in 1985.

Transportation expenditures (purchase of new or used vehicles; repair and maintenance; gasoline; finance charges; public transportation; taxi and airline fares; parking fees and registration; and insurance) gradually replaced food as the second largest share of a family's budget. As a percentage of total expenditures, transportation made up a larger share for

rural than urban households. In real dollars, transportation expenses were higher for urban households in 1960/61, but higher for rural households in 1985; in 1972/73 these real expenditures were approximately the same between urban and rural households. Food expenditures (food purchased at stores; school meals paid for; dining out at restaurants; and food bought and prepared on out-of-town trips) declined as a percentage of total expenditures and in real dollars over the 1960/61 to 1985 period for both groups of households; these expenditures were higher in real dollars for urban households.

Two principal reasons for variations in expenditures over time are changes in household consumption and the changes in prices of budgetary items. Price change was especially applicable for housing. The average sales price of a new home increased 480% between 1963 and 1986, whereas the corresponding increase in prices of all goods and services measured 258% (7). Although housing expenditures consumed a smaller proportion of the budget for rural households, these families had a higher home ownership rate than urban households. In 1980, 80% of rural households owned their own home compared with 59% of urban households (4). However, rural housing lagged behind urban housing in quality and amenities.

Higher real transportation expenditures resulted from the rise in gasoline costs and the number of automobiles owned by a family. In 1960 the average number of automobiles per household was one, but in 1985 it was two (10). Transportation expenditures being greater for rural as opposed to urban households in 1985 is likely due to rural households owning more vehicles as public transportation is not as widespread in rural areas (8). The decrease in real food expenditures during the 1960/61 to 1985 period was due to lower growth in real food prices as compared to all goods and services as well as a decline in average household size for rural households.

Economic Status of Urban and Rural Households by Selected Characteristics

Examining the current economic status of urban and rural households by selected household characteristics can help clarify how urban and rural households are faring economically. Households will be examined by household type (husband/wife with children versus single-parent families), race (white versus nonwhite), and age of the household head (under 65 versus 65 and over).

Household Type

Husband/wife households with at least one child under age 18 and residing in an urban area had an after-tax income 46% higher and total expenditures 28% higher than their counterparts residing in a rural area (table 2). The average household size of both groups was the same (4 members) so rural husband/wife families also had lower per capita income and expenditures than urban husband/wife families. Housing comprised the largest share of total expenditures for urban husband/wife households whereas transportation accounted for the largest share of the budget for rural husband/wife households. However, transportation as well as housing expenditures were

higher in dollar terms in urban husband/wife families. Expenditures on other goods and services accounted for similar shares of the budget for urban and rural husband/wife households.

The income gap between urban and rural single-parent households (who account for approximately 1 of 4 families with children) was less than that between urban and rural husband/wife households with children. Urban single-parent households had an after-tax income 15% higher than rural single-parent households; average household size was the same for both groups (3 members). The relatively lower income difference between urban and rural single-parent households may reflect different demographic characteristics of these households. Cautley and Slesinger found that women who head families with children in rural areas are more likely to be widowed and older than such females in urban areas. These rural female heads of families probably were entitled to Social Security and pension benefits and were able to accept employment because young children were less likely to be in the household (1).

In this study, rural single-parent families obtained a higher percentage of their income from alimony and child support than urban single-parent families (10% versus 6%). This higher percentage probably is due to rural single parents receiving a lower proportion of income from wages and salary. Total expenditures for single-parent households residing in an urban area were only 7% higher than those for single-parent households residing in a rural area. Housing consumed the highest proportion of the budget for both groups; in urban single-parent households, housing accounted for 40% of total expenditures and in rural areas, 32%. On average, single-parent families in both urban and rural areas had total expenditures that exceeded their after-tax income. This likely represents debt that will have to be repaid with future earnings.

Single-parent households residing in urban or rural areas had much lower total and per capita after-tax income than did corresponding husband/wife families. Total and per capita expenditures of single-parent households residing in an urban or rural area were also lower than corresponding figures for husband/wife families. In urban households, per capita expenditures for individual budget items were lower for single-parent families for all items; in rural households per capita expenditures for housing and clothing were higher in single-parent households than in husband/wife households.

Race

Urban white households had an after-tax income 32% higher and total expenditures 17% higher than rural white households (table 3). Average household size for both groups was 3 members so per capita income and overall expenditures were higher for urban white households. Housing expenditures made up the largest share of the budget for both groups. Transportation expenditures were higher as a percentage of total expenditures and in actual dollars for rural white as opposed to urban white households. Again, this is likely due to rural households owning more vehicles than urban households.

Nonwhite households residing in an urban area had an after-tax income 36% higher and total expenditures 29% higher than nonwhite households residing in a rural area; average household size for both groups was 3 members. As with white households, housing expenditures accounted for the largest share of total expenditures for both urban and rural nonwhite households, although urban nonwhite households allocated a larger percentage than rural nonwhite households (36% versus 28%). Rural nonwhite households spent a higher budgetary share on transportation than their urban counterparts, but both groups spent approximately the same dollar amount.

For both urban and rural areas, white households had a higher after-tax income and total expenditure level than nonwhite households. Hence, per capita income and expenditures were higher for white households in both urban and rural areas.

Age of Head

Households with a head under age 65 living in an urban area had an after-tax income 25% higher and total expenditures 14% higher than their counterparts residing in a rural area (table 4). Both groups had the same average household size (3 members) so per capita income and total expenditures were higher for urban households with a head under age 65 than rural households with a head under age 65. Housing expenditures made up the largest share of the budget (34%) for urban households with a head under age 65, whereas both housing and transportation expenditures were tied for the largest share of the budget (28%) for rural households with a head under age 65. There was little difference in the percentage share of the budget for other items between urban and rural households with a head under age 65.

The after-tax income gap between urban versus rural households with a head 65 or over was much greater (47%) than that for urban and rural households with a head under age 65. Glasgow found that much of the income difference between metro and nonmetro elderly was due to the nonmetro elderly having lower education and a more advanced age (2). Average household size for urban and rural households with a head age 65 or over was also smaller (2 members) than households with a head under age 65. The total expenditures of urban households with a head age 65 or over were 21% higher than those of rural households with a head age 65 or over. Housing and transportation expenditures made up the largest percentage of total expenditures for both groups. Health care accounted for a much higher budgetary share for households headed by a person age 65 or over in both urban and rural areas (11% and 12%, respectively versus 4-5% for households with a head under age 65). Rural households with a head age 65 or over had total expenditures that exceeded their after-tax income on average.

Households headed by a person age 65 or over and residing in either an urban and rural area had a total and per capita after-tax income lower than households headed by a person under age 65 in each respective area. Total and

per capita expenditures of households headed by a person age 65 or over were also lower than those of households headed by a person under age 65 in rural areas. Total expenditures were lower for households headed by a person age 65 or over in urban areas, but their per capita expenditures were higher than households headed by a person under age 65. Regarding individual budget items, urban households with a head age 65 or over had higher per capita expenditures on housing, food, health care, and other goods and services (personal care, gifts, etc.) than urban households with a head under age 65. Rural households with a head age 65 or over had higher per capita expenditures on food, health care, and other goods and services than rural households with a head under age 65.

Conclusion

Whether urban and rural households are economically better or worse off today than in the past depends on how economic well-being is defined. A growth in total or per capita after-tax income in real terms is the most common definition. By both measures, the economic well-being of urban and rural households increased from 1960/61 to 1972/73, then diminished between 1972/73 and 1985. Any growth in real income was due primarily to an increase in what has been termed the sweat factor of a household, specifically the entrance of a wife/mother into the workforce. Overall, during the 1960/61 to 1985 period, after-tax income of urban households increased 10% and that of rural households, 18%. The volatility of real income changes over time was greater for rural than urban households.

Total expenditures followed the same pattern as income, increasing 7% for urban households and 31% for rural households over the 1960/61 to 1985 period. Thus, during this period urban households experienced greater growth in after-tax income relative to total expenditures, whereas rural households experienced greater growth in total expenditures relative to after-tax income.

Examining urban and rural households by selected characteristics, urban households had higher after-tax income than rural households regardless of household type, race of the household, and age of the head. There was a narrower income gap between urban and rural single-parent households than other family types. This may reflect different characteristics for single parents in the two areas (i.e., rural single parents were more likely to be widowed and older). However, both urban and rural single-parent households had total expenditures that exceeded their after-tax income on average. This likely represents debt to be repaid with future earnings. Whether single-parent households will have a future income to cover present debt is an area for further research.

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Table 1. Income and expenditures of urban and rural households, in 1985 dollars

	1960/61		1972/73		1985	
	Urban	Rural	Urban	Rural	Urban	Rural
Before-Tax Income	\$24,158	\$16,374	\$29,073	\$24,322	\$25,857	\$19,563
After-Tax Income	\$21,322	\$15,146	\$24,704	\$21,135	\$23,523	\$17,864
Total Expenditures	\$19,469	\$13,459	\$22,467	\$18,551	\$20,809	\$17,653
(as a percent of total expenditures)						
Housing	29%	26%	30%	27%	34%	28%
Transportation	15	17	19	23	22	27
Food	24	25	19	20	17	17
Other	32	32	32	30	27	28
Household Size	3	4	3	3	3	3

Table 2. Income and expenditures of urban and rural households by household type, 1985

	<u>Husband/Wife Household with Children</u>		<u>Single-Parent Household</u>	
	Urban	Rural	Urban	Rural
Before-tax income	\$36,601	\$25,284	\$15,438	\$13,076
After-tax income	\$33,487	\$22,988	\$14,237	\$12,414
Total Expenditures	\$28,870	\$22,492	\$15,900	\$14,883
(as a percentage of total expenditures)				
Housing	32%	27%	40%	32%
Transportation	24%	29%	16%	27%
Food	17%	17%	19%	18%
Clothing	6%	5%	7%	6%
Entertainment	6%	6%	5%	5%
Health care	4%	6%	4%	4%
Education	2%	1%	2%	1%
Other	9%	9%	7%	7%
Household Size	4	4	3	3

Table 3. Income and expenditures of urban and rural households by race of household, 1985

	<u>White Households</u>		<u>Nonwhite Households</u>	
	Urban	Rural	Urban	Rural
Before-tax income	\$26,802	\$20,259	\$19,633	\$14,288
After-tax income	\$24,342	\$18,461	\$18,127	\$13,336
Total Expenditures	\$21,540	\$18,343	\$15,996	\$12,423
(as a percentage of total expenditures)				
Housing	33%	28%	36%	28%
Transportation	22%	27%	21%	27%
Food	16%	17%	17%	19%
Clothing	6%	5%	7%	5%
Entertainment	6%	6%	4%	3%
Health care	5%	7%	4%	6%
Education	1%	1%	2%	1%
Other	11%	9%	9%	11%
Household Size	3	3	3	3

Table 4. Income and expenditures of urban and rural households by age of household head, 1985

	<u>Household Head Under 65</u>		<u>Household Head 65 or Over</u>	
	Urban	Rural	Urban	Rural
Before-tax income	\$27,989	\$22,297	\$16,960	\$11,389
After-tax income	\$25,342	\$20,203	\$15,934	\$10,873
Total Expenditures	\$22,228	\$19,435	\$14,887	\$12,327
(as a percentage of total expenditures)				
Housing	34%	28%	34%	29%
Transportation	23%	28%	17%	22%
Food	16%	17%	18%	18%
Clothing	6%	5%	4%	4%
Entertainment	6%	6%	4%	3%
Health care	4%	5%	11%	12%
Education	2%	1%	0%	0%
Other	9%	10%	12%	12%
Household Size	3	3	2	2

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CHILDREN IN NONMETRO AMERICA: ECONOMIC WELL-BEING IN A FAMILY CONTEXT

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Introduction

The economic well-being of children in nonmetro America is an important issue for local community planning and rural development policies. Childhood poverty, which has been persistently higher in nonmetro areas, is strongly influenced by parental education and employment status. The socio-economic status of parents is, in turn, associated with local training and employment opportunities. Conditions in the national economy will also affect family income and the resources available to children growing up in nonmetro areas. The type of childhood experienced in the rural community will undoubtedly affect the decisions of the next generation about remaining in the community. As the family is the building block of the community, public and private officials in local communities need to be aware of the changing nature of family living arrangements and their impact on current and future poverty conditions.

This paper analyzes the relative economic well-being of children in families with at least one parent present, comparing those in nonmetropolitan areas with those in metropolitan areas. Economic well-being is measured by the poverty status (an income/needs ratio) of the family and the receipt of both cash assistance and noncash benefits. The aim is to develop a comprehensive profile of the factors in a child's family environment which influence the economic realities experienced by children. This paper will discuss recent trends in childhood poverty and family living arrangements by metro-nonmetro residence; residential differences in poverty status by social, economic, and demographic characteristics; and differences in the receipt of cash assistance and noncash benefits.

Data and Sample Selection

The data in this paper are based on the March 1988 income and demographic supplement to the Current Population Survey (CPS). Data on employment and income refer to the preceeding year, whereas demographic data refer to the time of the survey. The March supplement provides a wealth of information on the demographic and socioeconomic characteristics of households and families, making it an excellent source of data to study the well-being of children under 18 years, their living arrangements, characteristics of their parents, and other household and family conditions.

The sample universe in this study is composed of children under 18 years of age living in a family household with at least one related adult present.

The data are based on counts of "related" children, which include own children plus all other children in the household related to the householder by birth, marriage, or adoption. Married children under 18 years old who are living with at least one adult relative are also included, since they are not yet living independently and their family's economic situation has a direct bearing on their welfare. Unrelated individuals under 18 years of age were excluded from the universe because they are not included in the CPS definition of family poverty status.

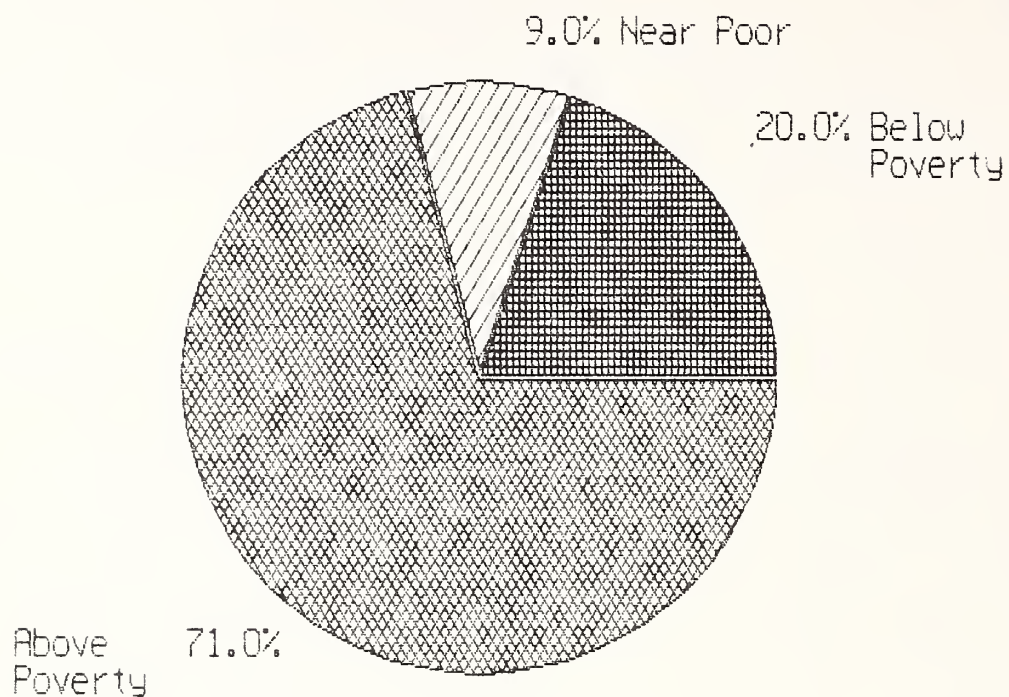
Poverty Status and Recent Trends

Poverty status is an indicator of the economic well-being of a household; the "poor" can be defined as those whose total economic resources are inadequate to meet a minimal living standard (Lerman and Mikesell, 1989). Poverty status is determined by comparing total family income to a poverty threshold, adjusted to take into consideration family size, number of children, and age of the family householder. All relatives are treated as a unit in the definition of family poverty status. The poverty rate is the percentage of persons with family incomes below the poverty level. Those defined as "poor" have incomes less than 100% of the poverty threshold; in 1987, the poverty threshold for a 3-person family with one child under 18 years was \$9,142. The poverty threshold for a 4-person family with 2 children under 18 years was \$11,519. The "near poor" are defined as having incomes from 100 to 149% of the poverty line; for a 3-person family with one child under 18, the maximum income was \$13,622. Those of "modest" income range from 150 to 299% of the poverty level, while those with "moderate" or "high" incomes are at a level 300% or more of the official poverty line.

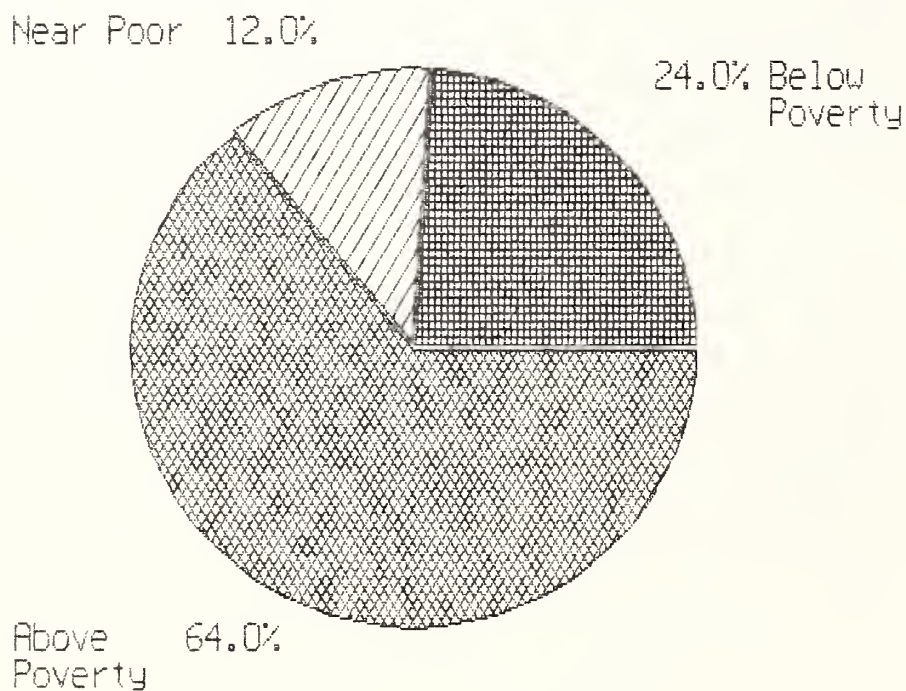
The CPS poverty definition does not include a measure of family assets. An alternative measure of poverty which included both money income and personal wealth yielded no net change in rural or urban poverty rates (Lerman & Mikesell, 1989). Nor does poverty status as defined in this paper adjust for any differences in the cost of living; without an accurate method of adjusting for geographic area, this would introduce more error into the measure. In any event, the poverty level represents a minimum standard of living, and even if one geographic entity has a slight advantage with a lower cost of living, the poverty threshold in any area would hardly constitute a "comfortable" standard of living.

Nearly 13 million children or 21 percent were below the official poverty line in 1987. Figure 1 shows that nearly 24 percent of all nonmetro children were in families below the poverty level, compared with almost 20 percent of their metro counterparts. In addition to children in poor families, 12 percent of nonmetro children and 9 percent of metro children were classified as "near poor". The financial standing of the "near poor" is precarious at best; although family income is barely above the poverty line, it may be high enough to disqualify them from receiving certain types of public assistance or noncash benefits, including food stamps, free or reduced-price lunches, public or subsidized housing, and Medicaid health insurance. In sum, a larger proportion of nonmetro children are either poor or near poor (36 percent) than their metro counterparts (29 percent).

Figure 1. Poverty Status of Metro
Children 1987



Poverty Status of Nonmetro
Children



Childhood poverty and economic well-being improved during the 1960's, bolstered in part by the introduction of noncash benefit programs such as food stamps, subsidized housing, Aid to Families with Dependent Children (AFDC), and other welfare programs. Poverty rates have historically been higher in nonmetro areas than in metro areas (McGranahan, 1985). The 1970's was a decade of change for rural America; employment opportunities expanded, a reversal in the long-time trend of rural out-migration occurred, and technological advances (especially in transportation and communication) transformed rural life. Despite such progress, rural America continues to lag behind urban America in income and numerous other measures of social and economic well-being. Rural poverty remains a problem of major dimensions (Deavers, 1989; Ross & Morrissey, 1987).

During the 1970's - a peak period of nonmetro growth - the economic well-being of nonmetro children improved and the residential difference in poverty level declined somewhat (Figure 2). The metro-nonmetro convergence in childhood poverty in the 1970's was due in part to improved opportunities in nonmetro areas and to diverging patterns in family structure (McGranahan, et. al., 1986). Since 1978, however, poverty rates have increased for both nonmetro and metro areas, with a somewhat greater increase in the nonmetro rate. As of 1987, a larger proportion of nonmetro children were poor (24 percent) than their metro counterparts (20 percent). The higher level of poverty in the 1980's can be attributed to the recession of the early 1980's and the slow rural recovery (Reid, 1988).

The top portion of figure 2 illustrates the much greater incidence of poverty for children in female-headed families (mother-only families), with a more than doubling of the poverty rate for both residential areas. For nonmetro children in mother-only families, poverty rates are higher throughout the period, with the exception of the early 1970's when the poverty rates converged. Childhood poverty in metro areas increased from the late 1970's to a slightly higher level in the 1980's. Nonmetro poverty conditions improved during the 1970's, especially in the first part of the decade. In the latter half of the 1970's, however, nonmetro poverty rates rose again. The modest improvement in childhood poverty in nonmetro areas during the 1970's must be viewed as a brief respite in the overall trend of deteriorating economic conditions for children.

In sum, the trends in Figure 2 have underscored the persistence of childhood poverty and the importance of residential and family structural differences. A consistently higher level of childhood poverty is found in nonmetro areas. Furthermore, significantly higher rates of poverty are found for children in female-headed families. Type of family exerts an even stronger influence on poverty than does residence. The persistence of high childhood poverty is due in part to recent increases in the proportion of children in mother-only families - from 11 percent in 1970 to 21 percent in 1988. With an increasing proportion of children in female-headed families, poverty rates can be expected to remain high, even with economic recovery in the 1980's (Edelman, 1987; Masnick, 1986; McGranahan, 1985; Preston, 1984).

Figure 2. Children Below Poverty Level,
by Family Type and Residence

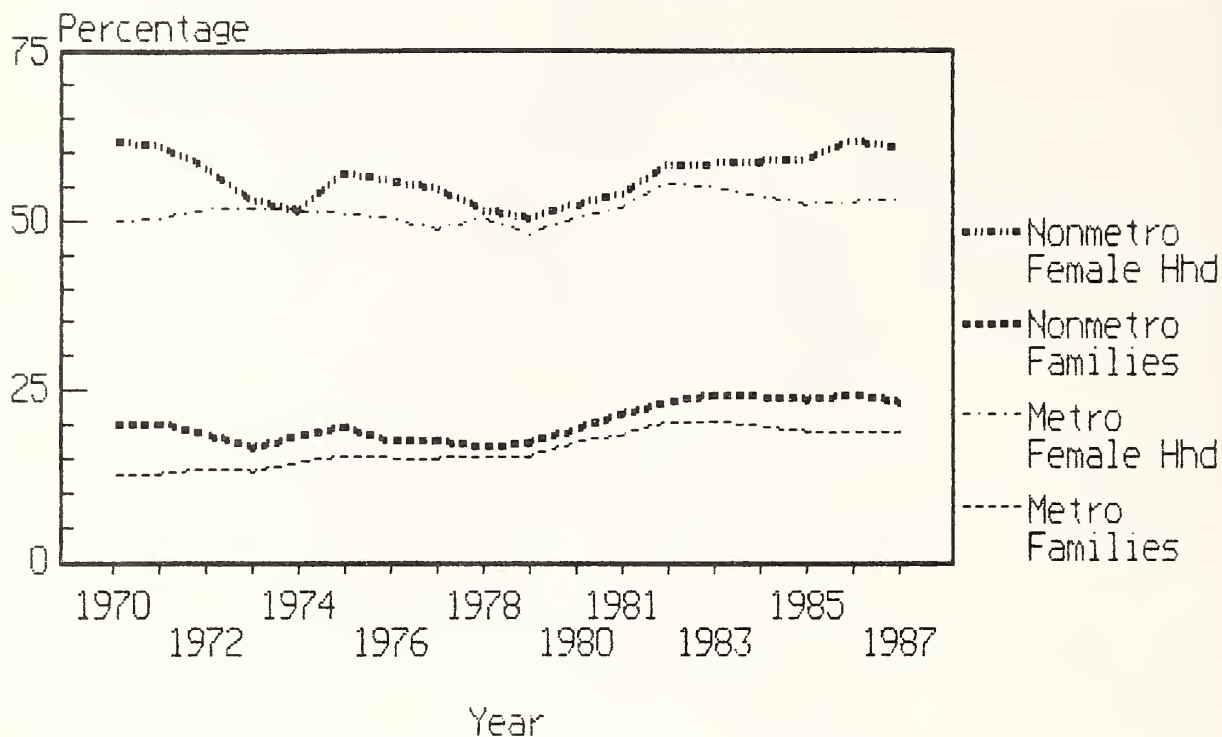
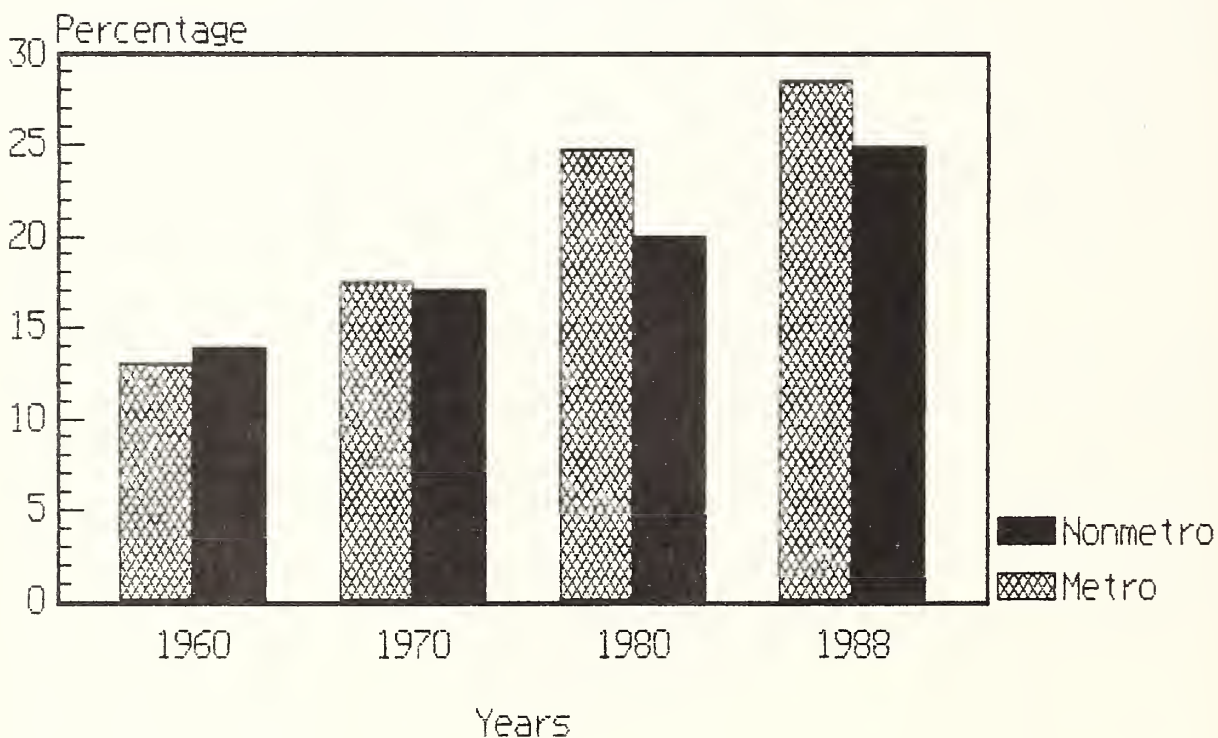


Figure 3. Proportion of Children Not
Living with Both Parents



Changes in Family Living Arrangements

There have been significant changes in the structure and function of American families in society in the past 25 to 30 years (Bianchi & McArthur, 1989; Cherlin, 1981; Zill & Rogers, 1988). More children can expect to live in a single-parent household at some point in their lives due to an increase in out-of-wedlock childbearing and divorce. More mothers, including those with young children, are also employed outside the home. In addition, parental education levels have risen, average family size has fallen, and child-rearing practices have been changing. These recent changes have led to a different type of family experience for American children. Some of the new realities of American family life are positive for children and their parents, while some are negative, raising concern about the effects of these new family circumstances on the well-being and development of children today (Zill & Rogers, 1988).

Changes in the family circumstances of children have an important bearing on children's welfare (Zill & Rogers, 1988). Numerous studies have documented the economic disadvantages to children living in mother-only families (Bauer, 1986; Congressional Research Service, 1986; Masnick, 1986). Although attention has been focused on the breakdown of the family in central cities, Figure 3 shows a steady increase in the proportion of nonmetro children not living with both parents - the percentage nearly doubled, from 14 percent in 1960 to 25 percent in 1988. In 1970, both metro and nonmetro areas had similar proportions of children not living with both parents; during the 1970's, the proportion increased more rapidly for children in metro areas than in nonmetro areas, widening the residential gap. By 1988, the gap between metro and nonmetro areas had lessened somewhat, with 29 percent of metro and 25 percent of nonmetro children not living with both parents. These statistics strongly suggest that some convergence in the residential pattern of family living arrangements had occurred by the late 1980's, with nonmetro family structure closely paralleling that of metro areas.

Rural-Urban Household Differences Urban and rural areas have traditionally differed in their patterns of household size, growth, and structure. Some factors associated with household-related differences between rural and urban areas include: higher rural fertility, earlier age at marriage in rural areas, chronic rural out-migration of couples of childbearing age, economic dependence on farming and other extractive industries, and more traditional rural attitudes about families (Fuguitt, Brown & Beale, 1989). With the decline in the importance of traditional rural industries, including farming, along with advances in transportation and communication (thereby lessening the effects of distance and isolation), major rural institutions have become more similar to their urban counterparts. During the 1970's, several changes occurred in the lifestyle of families in small towns and rural communities, including a decline in family size, a growing diversity in employment, and a changing role for women, most noticeably increased labor force participation (Coward, 1980; Coward & Smith, 1981; Fuguitt, et. al., 1989). Rural areas also experienced an increase in the number of female-headed households with children under 18 (Fuguitt, et. al., 1989). Although rural families have become more like urban families, with increased rates of divorce, decreased

fertility rates, and larger numbers of women working outside the home, the urban/rural distinction persists (Coward, 1980).

Metro-nonmetro family living arrangements have become more alike, though the urban-rural components have remained distinct. Rural areas, regardless of metro-nonmetro county location, continue to have a higher proportion of married-couple households with minor children, a smaller percentage of single-parent families, and a much lower percentage of persons living alone (Fuguitt, et.al., 1989). Thus, while changes in the lifestyle of rural families have paralleled urban changes, rural people still marry earlier, have more children, and live in larger households. The larger rural component in nonmetro areas accounts for the basic metro-nonmetro difference in family and household structure; the rural component of the nonmetro population has a much greater effect on nonmetro family living arrangements.

Poverty Status by Selected Characteristics

A high percentage of children in the nonmetro South were in poverty (nearly 31 percent). This is more than double the poverty rate for the lowest region - the Northeast (14 percent). When both poor and near poor children are considered together, there were striking differences by metro-nonmetro residence in both the South and West. In the South, 42 percent of nonmetro children were found to be poor or near poor, compared with 32 percent of their metro counterparts. A similar pattern is found in the West, with 38 percent of nonmetro children and only 29 percent of metro children found to be poor or near poor. Additionally, the financial position of children in homeowner families is considerably better than that of renters. Thirteen percent of nonmetro children in homeowner families were poor and 7 percent of metro children in such families were poor. In contrast, 45 percent of nonmetro children in renter families were poor and 40 percent of their metro counterparts were poor. A higher proportion of nonmetro children are in families that own their own home, and without this advantage, the economic disparity by residence would be greater.

Being in a family below the poverty level is more common for younger children and those in families with younger siblings. The highest poverty rates were found among children under 6 years old, nearly double the rates of children aged 12 to 17, in both metro and nonmetro areas. Furthermore, children in families with more than 2 siblings have a greater probability of being poor; the proportion of children in poverty increases incrementally with the addition of each child. Children in large families are clearly at an economic disadvantage; 53 percent of nonmetro children and 47 percent of metro children in families with 5 or more siblings were below the poverty line. Additionally, children in families with no earners or only one earner are more likely to be poor than those in families with at least two earners. The greater the number of adults in the family, the greater the probability of having more earners; and one would expect improved economic conditions in families with a more working adults.

In both metro and nonmetro areas, the black poverty rate was slightly more than 3 times that of white children. In nonmetro areas, nearly 59 percent of black children were poor, compared with 19 percent of white children. Black

children residing in nonmetro areas are more likely to face economic disadvantages, especially those in families with children under 6 years old, with four or more siblings, in mother-only families, and in families with no earners. A pronounced difference in poverty status also occurs by family structure, regardless of residence. The highest poverty rate is found among children living with female householders, 52 percent in metro areas and 61 percent in nonmetro areas. Children in married-couple families are more financially secure, with 9 percent of metro and 14 percent of nonmetro children in families below the poverty line. Children fare much better if they remain in stable, two-parent families than if they experience the loss of a parent, especially the father, from the household (Bianchi & McArthur, 1989).

The higher poverty shown experienced by black children and those in female-headed families is partially correlated. In both metro and nonmetro areas, black children are more likely than white children to be in female-headed households. Black children, regardless of residence, are more likely than white children to be in families with characteristics associated with poverty; they tend to be in families with a larger number of siblings and with no earner or only one earner present. Furthermore, parents of black children are more likely to be younger, not married, less educated, and unemployed or not in the labor force. These parental characteristics place black children at an increased risk of experiencing poverty. Children in female-headed families, regardless of residence, are especially disadvantaged; more than half of all children living only with their mother are found to be poor. Children growing up in female-headed families face a greater economic disadvantage - their mothers are more likely to have lower levels of educational attainment, lower income and higher unemployment (Masnick & Bane, 1980; Zill & Rogers, 1988). Children whose mothers graduated from college are more financially secure than those with less educated mothers; better educated parents are also more marketable in the labor force. As expected, employed mothers provide greater economic security for their children than unemployed mothers or those not in the labor force.

Race and family structure most likely interact with residential factors to determine childhood poverty status. Metro and nonmetro areas are quite similar in terms of family composition - the age distribution of children, the number and age(s) of siblings, and the number of earners in the family. However, nonmetro areas have a higher proportion of whites (86 percent) than metro areas (79 percent) as well as a higher proportion of married-couple families (77 percent, compared with 73 percent in metro areas). Without these differences in racial composition and family structure, the metro-nonmetro poverty differential would be greater.

In both residential areas, poverty was highest for children whose parents are under 25 years of age. Forty-seven percent of metro and 53 percent of nonmetro children with parents aged 18 to 24 years were below the poverty level. The lowest poverty rates occur among children with parents aged 35 to 49, usually considered the prime working years, when most parents are established in their careers and in their peak earning years. Advances in parental education, regardless of residence, improve the economic welfare of their children. Not surprisingly, children living with a parent who did not

complete high school were worse off than those with more highly educated parents. Half of all children whose parents had not advanced past elementary school were below the poverty line. High school graduation is clearly associated with improved financial well-being; 18 percent of metro and 22 percent of nonmetro children whose parents had graduated from high school were poor. There is undoubtedly an age-interaction effect taking place. The youngest parents are more likely to have had their high school or college educations interrupted due to childbearing. Additionally, parents at the older end of the age spectrum are less likely to have attained the same level of education as their younger counterparts, as evidenced by gains in adult educational attainment over time.

The children of employed parents have a clear financial advantage. The highest poverty rates occur to children whose parents are not in the labor force - two-thirds of all children in such families in both metro and nonmetro areas. Forty-nine percent of metro and 56 percent of nonmetro children whose parents are unemployed were below the poverty level. Parents employed in nonagricultural jobs were better off financially than those employed in agricultural pursuits, suggesting that local area employment opportunities can play a deciding role in childhood poverty and well-being. Both unemployed parents and those not in the labor force are without jobs; the lower proportion of the unemployed who are poor is probably due to a temporary condition. No residential difference is found in the proportion of parents not in the labor force who are poor; many in this group (persons who are not looking for work) can be described as the "persistently poor" - those trapped in poverty. Over one-half of the persistently poor were found in families with no earners (Ross & Morrissey, 1987). On the other hand, poverty among unemployed parents is more common in nonmetro areas. Being temporarily poor in rural areas, where family life is more stable, results more often from work-related events, such as the loss of a job or lack of local employment conditions, than from personal events such as divorce (Ross & Morrissey, 1987). With higher unemployment and underemployment in rural areas, many rural workers and their families may be exposed to periods of poverty. In sum, children are at a higher risk of being in poverty if their parents are not in the labor force, followed by unemployed parents and those employed in agricultural pursuits.

The poverty status of both metro and nonmetro children is affected by their parents' characteristics. Older, better educated, and employed parents are more likely to provide a financially secure home environment for their children. The parents of metro children tend to be better educated, and more likely to hold executive-managerial-administrative-professional and technical-sales-administrative support positions. Nonmetro parents are more likely to be employed in precision production and craft occupations and as operators-transport-laborers. Additionally, the parents of nonmetro children are more likely to be unemployed than their metro counterparts. These residential differences in parental education and employment contribute to an increased risk of nonmetro children being in poverty. The basic difference between the rural and urban labor markets is operative here, with a greater proportion of higher paid occupations and more highly educated workers in the urban labor market. With increased education of parents and more mothers

working for pay outside the home (Bureau of Labor Statistics, 1985; Zill & Rogers, 1988), economic conditions for at least some children may improve in the future.

Receipt of Cash Assistance and Noncash Benefits

Poverty status is used to determine eligibility for a number of federal benefits programs which provide either cash assistance or noncash benefits to needy families and individuals to help ameliorate some of the adverse conditions resulting from low income and resources. Many of these programs are means-tested, meaning that to be eligible, household income and assets must fall below a specified level. Some children (classified as "near poor" or with family incomes between 100 and 149% of the poverty level) may be denied such benefits because their household does not meet the eligibility rules, even though the child's family resources are far from a "comfortable" range. An examination of children participating in these federal benefits programs will add insight to an assessment of the overall economic situation of children.

Different universes are used for the various programs, which are determined by varying eligibility criteria (such as a low income test, an assets test, and the ages of children in the family). For example, households with children aged 5 to 18 are eligible for the free lunch program, with an additional requirement that the student lives in a household with an income below 125 percent of the official poverty level. Students who qualify for the reduced-price lunch program must be in households with incomes between 125 and 195 percent of the official poverty level.

Transfer payments have grown in importance as a source of income in nonmetro areas, representing nearly 19 percent of annual personal income (Ghelfi & Hoppe, 1989). Nonmetro children in families below the poverty level were more likely to receive food stamps than their metro counterparts; 63 percent of nonmetro and 58 percent of metro children received food stamps. No residential difference was found for receipt of a free or reduced-price lunch, with 87 to 88 percent of all poor children receiving this benefit. Similarly, no significant differences by residence were found for the receipt of selected other noncash benefits, including public housing, rent subsidies, and Medicaid. However, nonmetro children were somewhat more likely to receive rent subsidies than metro children, and the reverse is true for public housing assistance. This may be associated with the community itself, with public housing being more common in larger, metropolitan areas. Rent subsidies in nonmetro areas may be a more practical way to adjust for housing inequities.

About 42 to 43 percent of poor children, regardless of residence, received Aid to Families with Dependent Children (AFDC), compared with 10 to 11 percent of all children. Black children, those in mother-only families, and children with many and/or young siblings were more likely to receive AFDC assistance. Furthermore, children whose parents are younger, never married, less educated, and unemployed or not in the labor force were more likely to be receiving AFDC benefits. Even though government expenditures on welfare programs such as AFDC more than tripled between 1965 and 1980, levelling off

in the 1980's (Danziger & Gottschalk, 1985), a substantial number of poor children still do not receive such benefits. This could be due to the eligibility rules or to a lack of knowledge and/or means to gain access to the system itself. While AFDC payments do help some economically disadvantaged children, these payments are not adjusted for inflation (Social Security Administration, 1982). In sum, although many children in households below the poverty level do receive government benefits and such transfer payments/programs may reduce some of the economic disparities, a large number still live below a comfortable standard. Furthermore, increased nonmetro dependence on transfers makes their economies more sensitive to changes in government programs (Ghelfi & Hoppe, 1989).

To what extent do noncash benefits and other assistance programs improve the situation of poor children? Some insight into this question is gained from a Census Bureau study on estimates of poverty based on both money income and the value of selected noncash benefits (U.S. Bureau of the Census, 1987). The Census Bureau's report found that the number of poor in 1985 would be reduced by 8 to 35 percent (depending on which valuation technique was used) from the official poverty definition. In sum, it appears that transfer payments may reduce some of the disparities in household income and improve the economic welfare of disadvantaged children.

Multivariate Analysis of the Determinants of Childhood Poverty Status

Because of persistent metro-nonmetro poverty differentials, multivariate analysis was used to systematically assess the determinants of the economic well-being of children. The central question is whether residence in and of itself results in higher poverty for children in nonmetro areas or whether children in families with certain attributes that lead to an economic disadvantage are more concentrated in nonmetro areas. A method of standardization (multiple classification analysis) was used to assess the effect of a particular variable on poverty status, while holding other factors constant.

Other things being equal, the strongest predictors of the poverty status of children are parental education, the number of siblings in the family, and family structure. Education has a direct effect on poverty status and also an indirect effect, through its influence on labor force status and earnings. Holding other factors constant, the number of siblings has a strong impact on poverty status, with children in larger families clearly at an economic disadvantage. The economic advantage of children in married-couple families was significantly lowered when other factors were controlled. This suggests that certain factors associated with mother-only families - such as being black, less educated, and without a job - contribute to some of the economic disadvantages experienced by children in such families.

The results of the multiple classification analysis also show that the number of earners in the family, home ownership, metro-nonmetro residence, and parental age are important determinants of childhood poverty status. Metro-nonmetro residence has an independent effect on poverty status, when other characteristics of children's families are held constant. The average level of economic well-being for metro children is nearly 3 times the poverty

level, and for nonmetro children, it is approximately two and a half times the poverty level. Counter to expectations, race did not have a large effect on poverty status; the poverty status differential by race was substantially reduced when other factors were controlled. Thus, characteristics which are more concentrated among black families (such as lower educational attainment, larger families, and more female-headed families) undoubtedly contribute to their economic disadvantage. In both metro and nonmetro areas, the strongest predictors of poverty status are parental education, number of siblings, and family structure. The determinants of the economic well-being of children follow the same order of importance in both residential areas. However, the results of the multivariate analysis show that nonmetro residence itself has the effect of increasing the likelihood that a child will live in a family below the poverty line.

Summary and Conclusions

This paper has focused on the economic well-being of nonmetro children and compared their situation to their metro counterparts. Recent changes in the living arrangements of nonmetro children have paralleled those of metro children, with fewer children living with both parents and an increased number of children in families maintained by women. Although a slightly higher proportion of nonmetro children live in married-couple families, the one-parent family has definitely become more prevalent today.

Trends in childhood poverty since 1970 indicate that poverty is a persistent problem. Though some improvement occurred during the 1970's in nonmetro poverty rates for children, the recession in the early 1980's resulted in an increase in poverty during the 1980's. Poverty rates have remained higher over time for nonmetro children and children in female-headed families. With the noted increase in families maintained by women and the economic disadvantages faced by children in such families, childhood poverty can be expected to remain high. The introduction of public transfer payments had a positive effect on economic well-being in the 1970's; the higher poverty rates in the 1980's, however, reflect the effect of changes (such as a recession) in the national economy.

The cross-tabulations of poverty status in this paper have indicated that children living in nonmetro areas are economically disadvantaged when compared with their metro counterparts. In 1987, a larger proportion of nonmetro children were in families below the poverty level (24 percent) than their metro counterparts (20 percent). A substantial proportion of children were also found to be "near poor", or just slightly above the poverty line (from 100 to 149 percent of the poverty level). Regardless of residence, children in the South and children in renter households are more likely to be poor. Younger children and siblings as well as children in larger families are also more likely to be poor. The number of earners in the family is inversely related to the risk of being in poverty. Furthermore, black children and those in female-headed households have a greater likelihood of experiencing poverty conditions.

The socio-economic characteristics of children's parents influence childhood poverty similarly in metro and nonmetro areas. Parental age, educational

attainment, and labor force status have the greatest effect on poverty differentials. Younger parents, less educated parents, and those who are unemployed or not in the labor force are the most disadvantaged. The negative impact of these parental attributes is compounded for children living in mother-only families.

These results suggest that nonmetro areas are distinct from metro areas, and that nonmetro areas have been following recent metro trends in household size, family composition, and living arrangements, though lagging behind somewhat in these changes. This paper has attempted to provide a complete picture of the various factors in children's family environments that influence their economic well-being. Numerous studies have found that blacks, female-headed households, less educated persons, those residing in the South, and persons in nonmetro areas are more likely to be poor. This study has assessed the influence of these factors plus several others which have a direct bearing on children and their family lives. In addition to family structure, education, and residence, the poverty status of children is affected by the number of siblings, number of earners in the family, housing tenure, and parental age. Thus, the economic realities for children today are influenced by a multitude of factors.

The poverty status of nonmetro children is found to be influenced by various socio-economic factors in the same manner as their metro counterparts. The basic metro-nonmetro poverty differential persists, however, due to differences in the rural-urban residential balance. Nonmetro areas are 62 percent rural and influenced more heavily by traditional rural family structure and attitudes. On the other hand, the rural component (only 14 percent of metro areas) has a lesser impact in metro areas. Recent social changes occurring in metro areas may exert a greater influence in nonmetro areas in future years if demographic and social trends in the two areas converge. Many changes have occurred in the American family in the recent past; one of the most significant is that more children will experience living in a single-parent family at some point in their lives. While some of the recent changes in children's welfare are negative - poverty is persistently high and mother-only families are increasing, there are other more positive changes as well. Delayed marriage and childbearing has allowed parents to complete their educations and has also resulted in smaller completed family sizes.

Families are the building blocks of the community, and the higher incidence of children in poor families in nonmetro areas is an important issue to address in rural development plans. The economic stress experienced in rural America in the 1980's is reflected in slow job growth, high unemployment, rural out-migration, reduced population growth, and undeveloped human resources (Brown & Deavers, 1988). Rural development policies need to incorporate opportunities for education/training and employment at the community level, which can lead to greater earnings for parents and improved financial conditions for their children. Present conditions and policies will play a deciding role in the next generation's plans to remain in rural communities.

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ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.

STATUS OF AGRICULTURAL BIOTECHNOLOGY

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The application of the new tools of biotechnology to agriculture is growing at an unprecedented rate. The agricultural biotechnology revolution presents choices and challenges for the scientific community and policy makers. In presenting a perspective on this subject, I would like to stress four major points.

First, this new technology will affect nearly all aspects of agriculture and food and fiber processing in the future. There are a multitude of potential agricultural applications for the tools of biotechnology; improving yields, quality, and consumer acceptance of traditional agricultural products, producing new products, and reducing adverse environmental impacts of current technology. The United State is investing in research for that future!

Second, as with any new technology, how it is applied affects the risks. Public safety and environmental protection are of paramount importance. However, the implementation of any new technology, particularly one that has diverse and widespread applications, may create new risks to the environment and public health. In the United States, we have in place laws and regulations that will assure that products of biotechnology are efficacious, safe, and compatible with the environment. Through research guidelines, providing readily accessible data bases, and continuing research on biosafety, the system for control of biotechnology research will be strengthened further. How well that system works will depend in part on continuing research that helps us to better understand the interactions of organisms in the environment.

Third, in our democracy the public is very involved in how we increase agricultural productivity and the consequences of those choices on health and the environment. Public understanding of the new technology and its confidence in the regulatory system is essential if the benefits possible from biotechnology are to become reality in the marketplace.

Fourth, we believe in a free market system of fair trade practices that honors intellectual property rights. Product safety standards are important to consumers worldwide, but those standards should be science-based, not politically based. We are committed to the process of international harmonization of standards, including those for emerging products of agricultural biotechnology. We encourage cooperation and sharing of information on biosafety and ecological research in pursuing these goals.

Agriculture Productivity and the Environment

The growth in agricultural productivity in the United States has averaged about 2.5 percent annually since 1947, while the farm commodity part for consumer food cost has fallen steadily and accounted for 25 percent of consumer expenditures in 1987. Growth in productivity is sustained through the adoption of new technologies, including the reliance of agriculture on chemicals. But the cost/benefit to consumers of reliance on agrochemicals is being offset by environmental concerns. The application of biotechnology likely will be necessary to sustain the rates of productivity gain we have enjoyed in the past. If properly applied, biotechnology can have a significant impact on cost reduction and the quality of products delivered to the consumer. It also offers alternative choices in our strategies for the preservation and conservation of natural resources. Let me give you some examples.

The public is concerned about agricultural chemicals contaminating the soil and their effects on wild life; the impact on the quality of water and aquatic life, and perhaps most importantly the leaching of those chemicals over time into ground water and aquifers. Water conservation is becoming a major problem in parts of our country that is highly dependant on irrigation for agricultural production. As the population expands, we have choices to make on land use. Crops engineered for growth in land currently considered marginal for agriculture can make some of these choices less difficult. Consumers are concerned about pesticide and drug residues in food, the safety of food and color additives, and the nutritional content of their diet. Biotechnology offers the potential to provide alternatives in addressing these important issues. All of these areas are current topic areas for USDA funded research programs.

Biotechnology Research in the United States

Traditionally, the United States has relied on the Federal Government to support the long-term, high risk basic research, and sustain a healthy university system. It relies largely on private industry to identify technology needs and to develop products for commerce. The Technology Transfer Act of 1986 strengthens the partnership between government, academia and industry by allowing cooperative research and sharing of intellectual property rights.

The United States investment in research and development in 1989 was about \$145 billion -- about \$80 billion in the private sector and 65 billion supported by the Federal government. The biotechnology part is just under \$5 billion, most of which is devoted to biomedical research. In fact 2.7 billion is funded by NIH (40% of their research).

The private sector involvement initially was dominated by small venture capital companies, but has more recently expanded to the larger agribusiness companies, which are now making major commitments in their long term marketing strategies. Thus, not only are we at USDA conducting research in-house but we are actively conducting research with the private sector. Currently we have cooperative research and development agreements with 66 companies and we are negotiating projects with 35 additional companies. More than 50% of these projects are biotechnology related.

In the area of crop production, the private sector activities are spread across an array of improvements including improved crops (19%), propagation techniques (17%), genetic engineering (13%), biological herbicides and insecticide controls (13%), pesticide and disease resistance (12%), nitrogen fixation and other soil enrichments and inoculant (7%), and stress resistance (4.6%).

For livestock, the largest share of activities are in vaccines (24%), therapeutics (17%) and diagnostics (14%). These products forecast healthier food animals. New opportunities for breed selection and diet can generate leaner products of a nutritional content sought by our health conscious public. Although scientists are working to produce transgenic animals, commercialization probably will take much longer than for transgenic plants.

In the food processing sector, near-term advances will likely come from enzyme and fermentation products and processes, the development of new sweeteners and flavors, and new tools to detect food contaminants.

About 10% of the Department of Agriculture's research budget, or 100 million dollars annually, is being spent for agricultural biotechnology. Currently, the investment in plant research is about twice that for livestock. About 34% is being allocated to the Agricultural Research Service for research conducted in Federal laboratories. About 60% goes to universities -- half of that is being awarded as competitive grants and half to State Agricultural Experiment Stations associated with our land-grant universities.

Major breakthroughs in plant engineering will depend in part on advances in tissue culture technology to regenerate cells into whole, reproducing plants -- a technique not yet perfected for some of the most important crop plants. For example, one of the many areas being investigated by Federal scientists is engineering the hormone and nutrient balances necessary for tissue culture propagation for soybeans. Federal scientists are successfully growing tobacco, originating from tissue culture, which contains recombinant hormone and promoter genes from cauliflower, inserted through use of a bacterial vector. Scientists from the Agricultural Research Service were the first to engineer disease resistance into a woody plant. Peach trees produced through tissue culture, in addition to having resistance to a toxin produced by a disease causing bacterium, produced 10 times the number of peaches per tree. Much research is underway to identify genes and their functions. To speed up the process in a systematic way, the Administration is proceeding in a major effort on plant genome mapping. This project will provide basic knowledge opening new avenues for genetic engineering.

Environmental choices are inherent in the research and development investment strategy. Politicians will wrestle with the questions of what share of finite resources should be allocated to alternate strategies for low input sustainable agriculture and integrated pest management where payoffs in biotechnology research hold promise. They will also decide how much should be directed toward competing priorities such as the cleanup of toxic wastes sites, global warming and acid rain.

Realistically, we are many years away from that time when products of biotechnology will significantly change the agricultural system to a degree that becomes evident in the quality of the environment. On that road to progress we can learn from the experience of the industrial and chemical revolutions, what must be done in harnessing the tools of biotechnology to benefit society. One lesson is clear. We are only beginning to scratch the surface of understanding the complex interactions of organisms in micro- and macrocosms. So we must proceed cautiously in wielding the powerful new tools of changing life forms, while continuing to increase our understanding of ecology.

Unlike the development of products of biotechnology where intellectual property rights are involved, basic research in ecology must be a global endeavor because cooperation and sharing of information is mutually beneficial. The future of agricultural biotechnology will depend on continuing environmental research and the guidance it provides.

The Public's Role

The commercial future of biotechnology and its promise for a better tomorrow depends upon public acceptance and trust. Public education is essential to prevent a dangerous gap between the rapid progress in biotechnology and the public's understanding of the science. Some people seem to see only danger in technological change. None of us would advocate pushing the frontier of this new biology blindly forward throwing caution to the wind. But we, as a nation, want to make decisions based on science and logic, not based on oratory and unwarranted fear. An educated public is the key to effective public policy. That is why the Department of Agriculture held an international conference on biotechnology in 1987, four regional conferences in 1988, and live video conferences across the country. A high school curriculum has been developed for educating our young people. As part of the continuing educational efforts we publish a monthly newsletter entitled Biotechnology Notes, is published and widely distributed. The Office of Agricultural Biotechnology, APHIS, CSRS, and ARS have all sponsored conferences intended to inform the public and various special groups of the Department's biotechnology activity.

To build public trust, we must be up front with the public about the risks and benefits of new technology. We should also have in place a credible system of oversight for research and control over the release of new products into the environment. We have learned that one cannot spend too much effort in public education and interaction. The public must understand that there are choices and consequences involved in policy and decision making. Biotechnology may offer one of the best means of addressing agricultural productivity, food safety and environmental problems. But, if regulation were to become unnecessarily oppressive, beneficial products may never emerge. Laws and regulations dealing with biotechnology should protect the public health and environment as well as allow useful products to reach the public. The key is balance.

Biotechnology Control and Oversight

In the United States we have attempted to achieve that balance by applying varying degrees of control over biotechnology ranging from research guidelines; a notification and screening process before the use of "new" substances or "significant new

uses" not otherwise subject to regulation; and regulations which require licenses, permits or other clearances before introducing new products that may be of risk. This has not required any new laws. Existing laws for protecting agriculture from the introduction of plant pests and animal diseases, for environmental protection, and for the regulation of drugs, pesticides and food already provide an adequate framework. However, some of the agencies with regulatory jurisdiction have, or are in the process of updating their implementing regulations.

Research Guidelines

Early on, there was concern about the safety of research with recombinant DNA molecules. Within the Federal government it was agreed that research guidelines were needed to assure the safety of research with organisms containing recombinant DNA molecules and to protect the environment. The National Institutes of Health (NIH) was given the lead to develop guidelines for containment, and a system of review and oversight for research was established. The oversight system uses local Institutional Biosafety Committees (IBCs) to review the adequacy of containment and safety provisions for recombinant DNA research, in accordance with the NIH Guidelines. Experiments involving deliberate release or human subjects are reviewed by the NIH Recombinant DNA Advisory Committee, and approved by NIH. Adherence to the NIH Guidelines is mandatory for all federally sponsored research. The Guidelines have been widely accepted by the private sector as well, have reassured the public, and have allowed research to proceed in a timely and safe manner.

As agricultural biotechnology research progressed and investigators needed to further evaluate test potential new products outside the laboratory, the need for additional guidance became evident. In response to that need and a Congressional mandate, the U.S. Department of Agriculture (USDA) with advice from its Federal advisory committee -- the Agricultural Biotechnology Research Advisory Committee (ABRAC) -- is developing guidelines for conducting research outside a contained facility. USDA currently plans to prepare an Environmental Impact Statement for the guidelines with extensive public involvement.

The intent of the guidelines is establish fundamental principles upon which experiments with genetically modified organisms can be evaluated and upon which practices for confinement of organisms can be selected to maximize the safety of conducting an experiment outside of containment. Like the NIH Guidelines, it is anticipated that the "USDA Guidelines for Research with Genetically Modified Organisms Outside Contained

Facilities" will use a review and oversight system involving local IBCs and ABRAC.

Although still under development, certain concepts and principles have been recommended by ABRAC for the USDA Guidelines. One of these principles is that conditions under which research with organisms genetically modified through the deliberate insertion, deletion, or other manipulation of DNA or RNA can be conducted safely should be relative to conditions that are generally accepted for safely conducting field research with the unmodified (wild-type) organism. The genetic modification may have no effect on the safety of research with that organism, or it may increase or decrease the safety. The safety assessment should be based on the phenotypic characteristics of the modified organism rather than on the process of making the modification. However, knowledge of the precise modification, including the process by which it was made, may allow better predictability of the safety of the organism and its products, so that appropriate confinement and other safety practices for the research can be selected.

Defining the scope of organisms to which the USDA Guidelines will apply is problematic for several reasons. The public's attention is focused on potential risks for research involving genetic modification through recombinant DNA technology. But those risks are not inherently greater than risks for research with organisms in general or genetic experiments involving classical breeding methodologies. The agricultural research community has always been aware of the potential risks in developing hybrids, and the need to contain that research until a full evaluation of the hybrid justifies introduction into the environment. Basic principles of safety assessment are relevant to all agricultural research whether or not they involve genetically modified organisms. Recombinant DNA technology allows the development of hybrids beyond those which are possible through classical breeding, and for which there is an extensive history of management safety. However, unlike the classical methods, recombinant DNA technology can provide greater precision and control at the molecular level over the genetic manipulation.

A system of oversight ideally should depend on risk of the organism, based on its phenotypic characteristics, and not the process by which the genetic modification is made. In defining the scope of organisms to be addressed in the USDA Guidelines, public concerns must be adequately addressed, the need for oversight must be justified, and the impact on research and development and the quality of the environment must be carefully assessed before adoption of Guidelines.

To further assist the research community, USDA is preparing a handbook which will present a wide range of information that

investigators need to know in planning outdoor experiments with genetically modified organisms. It is anticipated that the handbook will discuss not only confinement and safety issues, but also will provide information on Federal regulatory jurisdiction and basic regulatory requirements, guidance on public relations, and a discussion of some of the sociological and economic concerns about research with recombinant DNA technology.

Also, USDA's National Biological Impact Assessment Program (NBIAP) has developed and will continue to expand computerized sources of information on agricultural/environmental biotechnology. The NBIAP can be accessed toll free using a personal computer with a modem. The extensive information in the data bases is designed, among other purposes, to assist an investigator in preparing a research proposal for biosafety review by a local IBC or a Federal agency.

THE REGULATORY FRAMEWORK

in 1986 the Office of Science and Technology Policy of the Executive Office of the President published the "Coordinated Framework for Regulation of Biotechnology" (Federal Register, June 26, 1986). The Department of Agriculture's Animal and Plant Health Inspection Service put into place in June 1987 the final rules for regulating genetically engineered organisms or products (7 CFR Parts 330 and 340, Federal Register, June 16, 1987). How well is that regulatory process functioning? The regulatory framework provides for the review and approval of products for commercialization and is functioning well where clearances are required for research involving the release of genetically engineered organisms into the environment.

Regulatory applications approved or under review as of November 1989, appear to reflect the distribution of biotechnology investment. The most extensive activity has been in the Department of Health and Human Services, where the Food and Drug Administration (FDA) has reviewed over 1000 applications involving diagnostics and clinical trials of drugs. In the food area, FDA reports they have only received 3 food additive petitions, all involving food processing enzymes.

Within USDA, the Animal and Plant Health Inspection Service (APHIS), which has jurisdiction for animal biologics, has reviewed 35 diagnostics 5 vaccines. Currently it is evaluating a vaccinia vectored bait formulation to control rabies in raccoons -- an increasing problem in the eastern United States. In addition, as of October 1989, 51 permits have been approved and issued by APHIS for field testing genetically engineered plants, involving such crops as tobacco, tomatoes, corn, potatoes, soybeans, cotton, alfalfa, rice and cucumbers.

The U.S. Environmental Protection Agency has had an equal successful record having reviewed engineered microbial pesticides and toxic substance notifications, many of which involved environmental release of genetically engineered organisms.

NATIONAL AND INTERNATIONAL HARMONIZATION OF POLICY

Because so many different parts of the Federal government are involved in biotechnology research and regulation, coordination has been vital in developing a consistent policy and resolving jurisdictional matters. This has been achieved largely through the Biotechnology Science Coordinating Committee of the White House. The Committee is comprised of a representative from the President's Office of Science and Technology Policy, the National Science Foundation, and top administration officials responsible for the research and regulation with the Departments of Agriculture, Health and Human Services, and the Environmental Protection Agency.

Policies for biotechnology must be coordinated internationally if we are to avoid discriminatory trade practices and realize the benefits this new technology can provide. The scientific community can and should lead the way. For example, the United States provided a discussion paper on "Good Developmental Practices for Small Scale Field Research" to the Organization for Economic Cooperation and Development (OECD) for consideration by an OECD group of national experts on safety issues in biotechnology. We at the Department of Agriculture have recently published a brochure entitled "Guidance for U.S. Researchers Involved in International Exchange on Agricultural Biotechnology."

We must continue to work toward international agreement on issues of safety and the environment, and join together in the development and sharing of information on biosafety. The importance of the environmental choices and challenges for biotechnology demand no less. Environmental policies should permit research that helps find new alternatives to sustain agricultural productivity while preserving precious natural resources.

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INTELLECTUAL PROPERTY RIGHTS FOR BIOTECHNOLOGY

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INTRODUCTION

Intellectual property can be protected through the use of federal statutes or through the use of state statutes or common law. Two types of statutorily authorized intellectual property protection are currently available for protecting biotechnology. As discussed in detail below, these are by patent (either a utility patent or a plant patent) and by plant variety protection certificate. General patent statutes covering the full range of human inventive art have been in effect in the United States since 1790. Only recently have plants and animals per se been deemed to be patentable subject matter under the general patent statutes (hereafter "utility patent(s)"; 35 U.S.C. § 101 et seq.). Utility patents were first allowed for plants and plant varieties following the decisions of Diamond, Commr. Patents v. Chakrabarty, 447 U.S. 303 (1980); Ex parte Hibberd, 227 U.S.P.Q. 443 (BPAI 1985); and Ex parte Allen, 2 U.S.P.Q. 2d 1425 (BPAI 1987). Plant patents directed to asexually reproduced plants were first authorized by the 1930 Plant Patent Act (PPA; 35 U.S.C. § 161 et seq.). The 1970 Plant Variety Protection Act (PVPA; 7 U.S.C. § 2401 et seq.) was enacted to provide patent-like protection to sexually reproduced plant varieties. Two types of protection are available under state statutes or common law principles, namely trade secrets and contracts. Each of these alternatives is governed by state law; consequently, the specifics of each may vary somewhat from state to state. An additional alternative is the tort law of conversion. The present discussion will be limited to patent, plant variety and trade secret protection.¹

PATENTS

Depending on the subject matter of the invention, two types of patents are available for the protection of plant biotechnology. The present discussion will be directed primarily to utility

patents. However, since a special statute (the PPA) was enacted to provide protection to asexually reproduced plants, a brief discussion of plant patents will also be presented.

Plant Patents

Applicability and Scope of Protection

A plant patent provides for the protection of "any distinct and new variety of plant, including cultivated sports, mutants, hybrids, and newly found seedlings, other than a tuber-propagated plant or a plant found in the uncultivated state" to "whoever invents or discovers and asexually reproduces [the plant]." 35 U.S.C. § 161. Although plants found in an uncultivated state are not subject to protection by a plant patent, a plant seedling in a cultivated state which is discovered and asexually reproduced is protectable. A plant in an "uncultivated state" refers to a wild variety, a plant existing in nature, one for which protection is not available to the discoverer of the plant under the PPA. A plant seedling, or a plant in a cultivated state, however, has arisen by the action of the plant grower, and its protection is thus available under the PPA. Sexually reproduced plants cannot be protected by the PPA. Asexual reproduction was viewed by Congress as the only method to insure the production of an identical plant. Protection under the PPA is directed to only a single variety (e.g., the rose "Peace") and not to a group of varieties having a common trait (e.g., a rose having white flowers). PPA protection grants the patent owner the right to exclude others from asexually reproducing the plant or selling or using a plant so reproduced. 35 U.S.C. § 163. A major disadvantage in plant patent protection is that such protection does not extend to plant parts, flowers, fruit, cuttings and the like which may be the commercial embodiment of the variety but which would not be capable of asexually reproducing the plant.

For a variety to be patentable under the PPA, the plant must be new, distinct, nonobvious and asexually reproduced. In order to be new (35 U.S.C. § 102), the variety must not have existed before, e.g., it must not have been (a) known before the date of the invention (discovery) or more than one year before the filing date of the application, or (b) in public use or sold or offered for sale more than one year before the application date. To be distinctive, the plant variety "must have characteristics clearly distinguishable from those of existing varieties." In addition to these requirements, the new variety must also be adequately and completely described in the specification. The description for a plant patent can be less than that required for a utility patent, as long as it is "as complete as reasonably possible." 35 U.S.C. § 162. It is unlikely that the description would be so complete as to enable a skilled artisan to make (i.e., reproduce) the new variety without the benefit of the patented variety. For this reason, asexual reproduction was made a requirement of the right to a plant patent. Likewise, the purpose of the description was

to enable identification of the new variety for the purposes of determining infringement. A deposit is not required under the PPA.

Infringement

The mere existence of a plant variety which had been asexually reproduced is not sufficient to prohibit patentability of the variety if (a) the distinctive characteristics of the variety and its value were not appreciated by anyone prior to discovery by the inventor or (b) no one had known of the existence of the variety.² This finding was followed in Yoder Brothers, Inc. v. California-Florida Plant Corp. et al.,³ in which the court said, "the whole key to the 'invention' of a new plant is the discovery of new traits plus the foresight and appreciation to take the step of asexual reproduction." The court in Yoder Brothers also determined that the requirement of distinctness for plants essentially replaced the utility patent requirements of utility and nonobviousness. The court concluded that (a) asexually reproducing a patented plant, (b) selling a plant so reproduced, or (c) using a plant so reproduced each constituted infringement under the PPA.

In determining infringement, a court will consider the characteristics of the alleged infringing variety against the description in the plant patent. If there is no match, infringement will not be found. For example, in Kim Brothers v. Hagler,⁴ the court concluded that the size and color of the allegedly infringing nectarines were not the same as the size and color of the patented nectarines described and shown in the plant patent. In addition, a court requires a showing of an asexual reproduction of the patented plant, i.e., a physical appropriation from one of the patented plants. When asexual reproduction has been established, a finding of infringement will result. See Armstrong Nurseries Inc. v. Smith et al.⁵

Utility Patents

Applicability and Scope of Protection

Utility patents provide protection to "any new and useful manufacture, or composition of matter or any new and useful improvement thereof" (35 U.S.C. § 101) which, in accordance with the Chakrabarty, Hibberd and Allen cases, includes chemicals (e.g., herbicides, insecticides and fertilizers), proteins, genes, DNA, RNA, vectors, microorganisms, plants, plant varieties, plant parts (e.g., seeds, pollen, fruit and flowers), hybrids, animals, animal parts and processes of producing any of these items. A utility patent grants the patent owner the right to exclude others from making, using or selling the patented invention for a period of 17 years. No protection is available before the patent issues, and the extent of protection is determined by the patent's claims - not by the abstract or the specification.

In order to be patentable, an invention must be new, useful and nonobvious. In order to be new (35 U.S.C. § 102), the

invention must not have existed before, e.g., it must not have been (a) known before the date of the invention (discovery) or more than one year before the filing date of the application, or (b) in public use or sold or offered for sale more than one year before the application date. One argument that is often made against novelty of biological materials is that the material is a product of nature. The claims of an invention cannot be directed to the material as it exists in nature, but must distinguish the natural product in some manner. Thus, we see claims directed to a protein having a certain level of purity or no glycosylation or directed to a gene as a cDNA sequence.

Although the United States grants a one year grace period from the date of public disclosure (i.e., a publication, use or sale made in the absence of a duty of confidentiality) before the application must be filed, most countries do not have such a grace period. As such, any public disclosure which is enabling (teaches or suggests to a skilled artisan how to make and use the invention) and which is made before an application is filed will result in the loss of foreign rights. A public disclosure may include a publication, a published abstract, a poster, a product brochure, or even a seminar or a Ph.D. defense where non-university employees are present. Thus, it is imperative that all proposed publications be reviewed for patentable subject matter.

In order to be nonobvious, an invention must not be an obvious variation to a skilled artisan from the prior art (patents and other references). 35 U.S.C. § 103. The issue of nonobviousness for utility patents has been addressed in great detail for most types of inventions with the exceptions of plants and animals. However, it is likely that the criteria of distinctness for plant patents and PVP certificates would also be used to determine obviousness for a plant (or animal) utility patent.

An additional requirement for obtaining a utility patent is that the invention must be described in such a manner so to enable a skilled artisan to make and use that invention. 35 U.S.C. § 112. In certain instances, such as for plants, varieties or hybrids, this requirement probably cannot be met by a simple description. In those instances, the claimed invention, or an essential material for making the claimed invention, must be available to the public after a patent issues. This public availability may be accomplished either by a deposit in a public depository of the biological material which then will be available to the public after the patent issues or by commercial sale of the material. In addition, the specification must also set forth the best mode for carrying out the invention. The best mode is the one contemplated by the inventor at the time the application is filed.

As previously mentioned, a patent grants its owner the exclusive right to make, use or sell the patented article or process. The unauthorized making, using or selling of an invention

is termed infringement. The patent owner's right extends only to the claimed subject matter, which may include a whole plant, a part of a plant, or any of the subject matter outlined above. A patent application is maintained in secrecy by the Patent and Trademark Office, and is not public until it issues. The term of a patent is 17 years from the issue date, during which protection is available, as long as the patent is maintained in force. 35 U.S.C. § 154.

From this brief discussion, it is evident that a key part of the patent is its claims. It is important that claims be carefully drafted to be sure that they cover the actual invention as well as the commercial embodiment. It is the claims which define the scope of the protection available to the patent holder. Many examples can be found in which the claims of a patent did not adequately cover the commercial embodiment of the invention, and competitors were able to easily move into that product's market. For example, to obtain the full value of a plant or animal variety utility patent, it is helpful to have claims directed to either a characteristic or a select group of characteristics rather than directed simply to a phenotype. Where the underlying genetics have not been precisely characterized, it is also helpful to describe the characteristic as a genetic factor.⁶ Providing that the specification teaches how to obtain and transfer the genetic factor to other varieties, the factor should be patentable without a detailed description of its genetic basis.

The experimental use exception is the sole restriction on the exclusive right granted by a patent. This exception is not found in the patent statutes but has been created by the courts. The extent of the exception is currently under debate within the legal profession. However, it is clear that the exception will be applicable in those instances of "pure" research often conducted in an academic setting. The exception may not be applicable, however, if the research is conducted with a commercial intent. Such an interpretation is based on dicta of recent cases.

A patent provides the patent holder with the right only to exclude others from practicing the claimed invention -- not with the right to do so. The ability to practice the invention may be restricted by an earlier, dominating patent or by statutes or regulations. Such statutes and regulations relating to new drugs, for example, restrict the ability of the patent holder to market a patented drug before the necessary regulatory approvals have been granted.

Infringement

Infringement of a patent is the unauthorized making, using or selling of the claimed invention during the life of the patent. There are three types of infringement recognized in the United States -- direct, induced and contributory infringement. In order to have either induced or contributory infringement, there must

first be direct infringement. Direct infringement is determined by comparing the accused product or method with the claims of the patent. Literal infringement occurs if the claims literally describe the accused product or method. If literal infringement does not exist, the accused product or method is then analyzed for infringement under the doctrine of equivalents. The doctrine of equivalents is an equitable solution to the problem which arises when an activity or product embodies trivial differences from a claimed invention. This doctrine provides for findings of infringement where an accused product or process performs substantially the same function in substantially the same way to obtain the same result as a patented invention.

An induced infringement is found in instances in which a party has aided and abetted another to infringe a patent. The inducer must have been an active participant in the line of conduct of the guilty actual infringer. That is, the inducer knowingly (i.e., purposefully or intentionally) must have taken active or affirmative steps with the knowledge that infringement is likely.

A contributory infringement is found in instances where a party has knowledge that the materials produced are especially made for infringement of the patent. A contributory infringer must also know that the materials are not staple articles of commerce and do not possess a substantial non-infringing use.

In many infringement actions, it is necessary to construe the claims in order to determine their proper scope. Several factors are involved in the construction of patent claims, including the prosecution history, the specification, the claims and expert testimony. Words which are defined in the specification must be given the same meaning when used in the claims. Specific limitations of dependent claims not present in broader independent claims cannot be read into those claims. Prosecution history can be used as an estoppel to prevent the patent owner from expanding the scope of the claims to include what was specifically given up during prosecution. Under the right circumstances, the estoppel can be applied to both claim amendments and arguments in efforts to obtain the patent.

PLANT VARIETY PROTECTION CERTIFICATES

Applicability and Scope of Protection

A plant variety protection (PVP) certificate provides for the protection of "any novel variety of sexually reproduced plant (other than fungi, bacteria or first generation hybrids)." 7 U.S.C. § 2402. Asexually reproduced plants and hybrids cannot be protected by the PVPA. The protection extends only to a single variety and not to a group of varieties having a common trait. An equivalent type of protection for animal varieties does not exist.

In order to be protectable under the PVPA, a variety must be new, uniform, distinctive and stable. 7 U.S.C. § 2401-2. In order to be new, the variety must not have been a public variety or available in this country or adequately described by a publication before the date of determination or more than one year before the filing date. This requirement is quite similar to the novelty requirement for patents.

To qualify as uniform, any variations in the variety must be predictable and describable. In order to be distinctive, the variety must differ from all other varieties by one or more characteristics. These characteristics need not be agronomically important characteristics. The definition of distinctness currently used by the PVP Office is one of the major weaknesses of PVP protection. A variety is stable if it remains unchanged when sexually reproduced.

PVPA protection grants the certificate owner the right to exclude others from selling, offering for sale, delivering, importing, exporting or sexually multiplying the variety, producing a hybrid from the variety, using its seed or progeny to propagate the variety and dispensing the variety without notice. 7 U.S.C. § 2541. The Secretary of Agriculture can require the certificate owner to grant licenses to third parties (compulsory licenses) if it is deemed to be in the public interest. 7 U.S.C. § 2404.

This grant, however, does include two important exemptions. The first exemption is a research exemption which provides others with the right to use the protected variety to develop new varieties. 7 U.S.C. § 2544. (As previously mentioned, there is currently a debate as to whether such an exception is available for patents.) The second exemption is a farmer's exemption. 7 U.S.C. § 2543. The farmer's exemption is a second major weakness of PVP protection. According to this exemption, it is not an infringement for a person whose primary farming occupation is the growing of crops for sale for other than reproductive purposes to save seed and use that seed either in the production of a crop on his farm or for sale to a person whose primary farming occupation is the same as his own.

Plant variety protection is granted for a period of 18 years from the issue date of the certificate, and is also available for the time between distribution of the variety with a proper notice and the issue date of the certificate. 7 U.S.C. § 2541. The application for a PVP certificate is maintained in confidence although the variety name, applicant, and filing date are published.

Infringement

The infringement issues which have been addressed by courts to date concern the farmer's exemption. In all of these cases, a farmer's exemption has been found to apply by the courts --

consequently, no infringement has been found. In Delta and Pine Land Co. v. Peoples Gin Co.,⁷ the only reported case concerning infringement under the PVPA, the court concluded that the farmer's exemption did not apply to either a non-profit agricultural cooperative which arranged sales of a protected variety or to a company which dispensed the protected variety without giving notice that the variety was protected. The court believed that the intervention of a third party acting as a broker or sales agent would frustrate the basic purpose of the PVPA because the third party was larger in size than a single farmer and would be more aggressive in marketing the protected varieties. After concluding that the farmer's exemption did not apply, the court concluded that there was infringement because (1) the variety had been (a) sold, delivered, etc. (7 U.S.C. § 2541(1)) and (b) dispensed without notice of its protected status (7 U.S.C. § 2541(6)) and (2) these actions were instigated or actively induced (7 U.S.C. § 2541(8)).

In Asgrow Seed Co. v. Kunkle Seed Co., Inc. et al,⁸ the district court refused to grant a preliminary injunction to halt the sale of seed of a protected variety of soybeans on the basis of the farmer's exemption, since less than half of the total volume of seed produced by the defendant was sold for reproductive purposes. The plaintiff alleged that the defendant's primary occupation was to sell seed, as evidenced by its (a) sale of some 1.42 million pounds of the specific protected seed (not including additional public varieties which were sold), (b) increase of acreage needed to grow such seed, and (c) intent to sell as much seed as possible, even though less than half of the farm income came from the sale of the specific protected seed.

TRADE SECRETS

Definition

To protect proprietary information, a company must possess a trade secret in order to avail itself of trade secret law. But what is a trade secret? Although there is no single definition, there are two widely accepted ones. The first is set forth in Section 757, Comment b, of the Restatement of Torts (1939) (hereinafter referred to as the Restatement). Comment b states, in part, that a trade secret

... may consist of any formula, pattern, device or compilation of information which is used in one's business, and which gives him an opportunity to obtain an advantage over competitors who do not know or use it. It may be a formula for a chemical compound, a process of manufacturing, treating or preserving materials, a pattern for a machine or other device, or a list of customers.

This definition prevails in the majority of state jurisdictions and has been adopted by the United States Supreme Court. A second definition is set forth in the Uniform Trade Secret Act. Since this latter definition is quite similar to the Restatement's, it will not be discussed here. According to the Restatement definition, in order to qualify as a trade secret, information must (a) be used in one's business, (b) provide a competitive advantage, and (c) be secret.

Subject Matter

It is clear in the above definitions that, unlike patents and plant variety protection certificates, there is no specific subject matter criteria for a trade secret. Almost any information can be a trade secret as long as the requisites of secrecy, competitive advantage and use (Restatement) are met. When the requisite criteria have been met, the following types of information have been found to be trade secrets:

... ingredients in foods, drugs and cosmetics; chemical compositions; computer programs and data bases; manufacturing, technological and scientific processes; geological and geophysical maps; flow-charts and blueprints; product specifications; customer lists; employee, training or other company manuals; and virtually any body of information.

Recently, a U.S. district court in Iowa held that a genetic message of an inbred corn line can be proper subject matter for a trade secret.⁹

Use and Competitive Advantage

In establishing the existence of a trade secret, the requirements of use and competitive advantage are minimal, while secrecy is by far the most important. Use and competitive advantage are often deemed to exist merely by virtue of a company's taking steps to meet the secrecy requirement. In fact, it may be more appropriate to consider use and competitive advantage merely as criteria rather than actual requirements, since very little case law has been devoted to a discussion of them. In essence, these criteria require that the designated information (such as plant germplasm) be believed reasonably to provide the trade secret owner with some non-speculative value and benefit in order to qualify as a trade secret.

Secrecy

While meeting use and competitive advantage requirements is arbitrary at best, the secrecy requirement must be met without exception. In general, if subject matter is not actually secret, it will not be protectable as a trade secret. Comment b, Section 757 of the Restatement sets forth the most frequently cited standard for secrecy, and states in part that:

The subject matter of a trade secret must be secret. Matters of public knowledge or of general knowledge in an industry cannot be appropriated by one as his secret. Matters which are completely disclosed by the goods which one markets cannot be his secret. ... Nevertheless, a substantial element of secrecy must exist so that, except by the use of improper means, there would be difficulty in acquiring the information.

A trade secret has only to be maintained in relative secrecy. The secrecy does not have to be absolute, i.e., known only to its owner. The secrecy must be considered to be reasonable, and in essence to be such that the trade secret is confided only in those who need to know in order to commercially exploit it. It may be necessary to disclose a trade secret to employees, contractors, suppliers, co-venturers and the like, in order to commercially utilize the trade secret. However, any disclosure should be confidential, or made under conditions which imply confidentiality. Generally, the standards of secrecy can be examined by analyzing two fundamental elements: (a) the general knowledge or availability of the information, and (b) the presence of affirmative steps to protect the information.

A first fundamental element of secrecy is that the information should not be generally known or available. If the subject matter of the trade secret has been voluntarily disclosed by the owner, or is public knowledge or general knowledge in the trade or business, it can no longer be protected as a trade secret. In essence, then, it is likely that secrecy does not exist for any information which has been published or distributed in any way, such as that contained in a book, magazine, trade journal, advertising brochure or catalog, or in a patent or any other public format. Similarly, if the product itself discloses the trade secret, the product must remain confidential. It is this requirement, in fact, which may foster ineffectual protection of many types of plant biotechnology by trade secret. Public information, however, may be protected as a trade secret if the value or utility of the information is not obvious or is not otherwise known to competitors. The information may be independently developed by several companies and still be considered a trade secret for each of them.

A second fundamental element of secrecy is that the trade secret owner must take adequate affirmative steps to protect the trade secret information. In general, a company must take greater care to protect its trade secret than it would take to protect other aspects of its business. If a company believes that such a trade secret exists, then active steps must be taken to maintain its secrecy and confidentiality. If such steps are not taken, trade secret protection will be lost. The degree of secrecy does not have to be absolute, but it must be reasonable. An excellent

guide in determining such protective steps is the standard practice in each industry.

Several steps which should be taken by a company in the protection of proprietary information include the following: (1) establish a written trade secret policy; (2) inform employees of trade secrets and remind them of their obligations of confidentiality; (3) restrict access (by physical separation, if possible) to trade secrets; (4) institute physical security measures (including storing trade secret documents in locked, limited-access files); (5) protect trade secret documents by labeling them clearly with proprietary notices; (6) maintain computer secrecy; (7) restrict company tours; (8) screen speeches and publications for unnecessary disclosure of trade secrets, and (8) inform others of the confidentiality of any disclosed trade secrets.

Misappropriation

Trade secret law provides the trade secret owner with the right to prevent the unauthorized use and disclosure of a trade secret by other parties. Section 757(a) of the Restatement states that disclosure or use of a trade secret constitutes misappropriation if (a) the trade secret was discovered by improper means; (b) the disclosure or use of the trade secret breaches a duty of confidence to the party from whom the secret was obtained; (c) the party was on notice that the secret was acquired by improper means or through breach of duty to another; or (d) the party was on notice that the trade secret was mistakenly disclosed.

"Improper means" includes theft, bribery, misrepresentation, breach of duty (or inducement to breach) to maintain secrecy, trespass or espionage. An otherwise lawful means which evidences an intent to appropriate a trade secret without permission or independent invention or discovery may also be considered to be improper. A confidential relationship can be established by contract, such as a nondisclosure agreement or a post-employment restrictive covenant, or by an implied contract/special relationship which establishes that the disclosure was made in confidence and was not to be disclosed or used. A party can be put on notice that the information is a trade secret, and that the disclosure was the result of a breach of confidence by (1) actual notice (i.e., the party is expressly informed by the trade secret owner), or (2) constructive notice (i.e., the facts and circumstances are such that the party should have known the information was a trade secret and was obtained through a breach of confidence). In the absence of actual or constructive notice, a party is not liable to the trade secret owner. However, the party may be liable to the trade secret owner after receipt of such notice, unless the party has materially changed positions and paid value for the secret in good faith before receiving notice. The burden of proving misappropriation rests with the trade secret owner. If this burden is initially met, then the onus is shifted

to the alleged misappropriator to prove that the trade secret was obtained by legal means.

Although trade secret law protects an owner from the misappropriation of its trade secret, it does not protect against the discovery of the trade secret by proper means. Proper means of discovering a trade secret include independent discovery, accidental or actual disclosure, and reverse engineering. If a product discloses the trade secret, or the trade secret can be determined from an analysis of the product, then the marketing of the product will result in a loss of trade secret protection. Examples of actual disclosure include the sale of plant varieties, vectors, genes or machines. A possible example of an accidental disclosure may be a disclosure of the inbreds from a sale of hybrid seed. Trade secrets can also be lost by disclosure in patents, published patent applications or other published materials, including advertisements or product brochures. With trade secrets which may need to be disclosed to governmental agencies, it is critical to indicate their confidentiality in order to avoid an accidental disclosure of the trade secret as a result of Freedom of Information Act requests. If the trade secret can be readily obtained from public documents, trade secret law may not provide protection (depending on the jurisdiction in which the misappropriation occurred) against a party who misappropriates it.

ISSUES

A discussion of intellectual property rights for biotechnology would not be complete without a brief examination of some of the issues which are often considered in the field, especially concerning the protection of plants and animals. One issue relates to the ability to protect a particular plant or animal variety. In PVP and patents, the issue revolves, respectively, around minimum distance and obviousness. Under the PVPA there is a basic lack of a distinctiveness criteria, such that minor changes in any trait are usually sufficient for a breeder to receive a PVP certificate. There is activity currently to attempt to adopt a minimum distance standard which would avoid this problem. The Patent Office has recently adopted an overly stringent standard of obviousness for new varieties. In order to overcome the Patent Office's position, it will be necessary to present evidence as to the amount of effort involved in the development of a new variety.

A related issue in patents concerns the scope of the claims of patents to a novel variety. Will the claims be limited to the patented variety itself, such that slight changes in the variety will result in the new variety falling outside the scope of the claims, or will the claims be given a somewhat broader scope to encompass such varieties?

A major issue at the present time is the farmer's exemption under the PVPA and the proposed farmer's exemption for transgenic animals under the patent statutes. The farmer's exemption under the PVPA has been subject to much abuse and effectively allows large-scale farmer-dealers to sell substantial quantities of seed of the protected varieties. There is currently considerable discussion to amend the PVPA by removing the farmer's exemption. In view of the abuse seen under the PVPA and the absence of any rational argument or need for a farmer's exemption for patented transgenic animals, it appears unadvisable at the present time to adopt such an exemption in the patent system.

Another issue which is often raised is the research exemption in the PVPA and the experimental use exception to patent infringement. The research exemption allows the use of a protected variety for developing new varieties, i. e., the use of the variety in a breeding program. However, in the case of hybrid crops, this provision is abused since the parent materials protected are not available for use in a breeding program. The experimental use exception allows for the use of a patented invention for experimental purposes. There is some debate as to the extent of this exception. The prevailing views are (a) that the invention should be available for research so that improvements can be made and (b) that research can only be conducted if there is no commercial intent. This issue will likely be resolved by further litigation.

Effects on the exchange of germplasm have often been raised as an issue under PVPA or patent statutes. Germplasm exchange is an issue in the United States and in the international arena as well. It was initially believed that the PVPA would negatively impact upon germplasm exchange, although such an impact has not occurred. Similarly, it has been argued that patents will adversely effect germplasm exchange. The effects of patents on germplasm exchange cannot be determined at this early date. However, it is likely that they will not have an adverse effect on the exchange of germplasm, although the manner by which germplasm is exchanged may see some changes.

An additional issue in the international arena is the type of protection available for agricultural biotechnology. For example, breeder's rights (plant variety protection) may be the exclusive form of protection for plant varieties in several countries. In other countries it may not be possible to obtain any protection for plant or animal varieties. However, it may be possible to obtain patent protection for a generic plant or animal. For example, it is possible to obtain a patent in Europe for generic plants such as those resistant to a specific herbicide. Although Europe has granted patents for generic plants, it has yet to grant a patent for a generic animal, such as the recently publicized Harvard mouse, for example.

The final international issue relates to the competitiveness of United States industry. This issue arises in the context of the Omnibus Trade Bill and the current General Agreement on Tariffs and Trade (GATT) negotiations. Essentially the United States is attempting to convince other countries to recognize intellectual property rights and to give them meaningful protection as a means to maintain the competitiveness of United States' industry in the world economic environment.

CONCLUSION

Several types of protection for intellectual property in biotechnology are available. The applicability and usefulness of any particular type, however, will depend on the type of technology that is to be protected. In many instances, utility patents provide the best protection for intellectual property. In those instances where it is difficult to ascertain the property from the product, such as with a novel method for producing a product, then protection by a trade secret may be as valuable as a utility patent. Trade secrets are not useful if the property is disclosed by the product or is to be published. Trade secrets would be more useful in the context of a sale with a restrictive use provision if such provisions were found to be valid and enforceable (thus enlarging trade secret protection). In any event, trade secret law does not prohibit independent discovery or reverse engineering.

Although there are presently a number of alternatives for the protection of biotechnology, there are many questions and issues concerning the validity, enforceability and viability of several of these alternatives. These questions will undoubtedly be answered through litigation, and at that time more definitive conclusions can be made as to applicability of these alternatives in the protection of plant biotechnology.

1. For further details on this subject see Proceedings of the Midwest Plant Biotechnology Consortium Symposium, Oct. 4-5, 1989 (in press); ASA Special Publication No. 52, Intellectual Property Rights Associated with Plants (1989); and U.S. Congress, Office of Technology Assessment, New Developments in Biotechnology: Patenting Life - Special Report, OTA-BA 370 (1989).
2. Nicholson v. Bailey, 182 F.Supp. 509 (S.D. Fla., Orlando Div. 1960).
3. 537 F.2d. 1347, 1377-80 (5th Cir. 1976).
4. 276 F.2d. 259 (9th Cir. 1960). See also Pan-American Plant Co. v. Matsui, 433 F.Supp. 693 (N.D. Cal. 1977) (disease resistant plant marked with a patent number and not original plant not entitled to protection since disease resistance not set forth in the patent description).
5. 170 F.Supp. 519 (E.D. Tex. 1958). Infringement resulted from the asexual reproduction and sale of the asexually reproduced plants. Induced and contributory infringement were also found in this case.
6. Claim 20 of U.S. Patent 4,513,532: A genetic factor derived from corn, which genetic factor is capable of conferring an extra leaf phenotype which is capable of transmission to progeny substantially as a single dominant gene.
7. 694 F.2d. 1012 (5th Cir. 1983).
8. A preliminary injunction was denied by the district court (W.D. La. 1987), which was affirmed by the Federal Circuit.
9. Pioneer Hi-Bred International, Inc. v. Holden's Foundation Seeds, Inc., _____ F.Supp. _____ (S.D. Ia. 1987), slip opinion dated October 30, 1987.

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AN OVERVIEW OF THE USDA'S WATER QUALITY INITIATIVE

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INTRODUCTION

Nonpoint source pollution caused by construction, urban runoff, mining and agriculture has become a national concern. Surveys of the Nation's water resources show increasing levels of pesticides and nutrients and trace elements that originate from agricultural operations. These nonpoint source contaminants are being transferred to groundwater aquifers by recharge from surface runoff and deep percolation through the soil profile. Concurrently, waters of lakes and streams are being degraded through these same processes.

In response to this concern, President Bush recommended a new initiative for enhancing water quality in his 1990 budget proposal to the Congress, presented on February 9, 1989. The President's initiative defines a vigorous effort to protect ground and surface water from potential contamination by agricultural chemicals and wastes, especially pesticides and nutrients. The initiative integrates the combined expertise of Agencies from the USDA, USGS, EPA and NOAA to promote the use of environmentally and economically sound farm production practices, and to develop improved chemical and biological pest controls.

PRINCIPLES:

In implementing the water quality initiative, the USDA will follow the following principles.

- o The USDA is committed to protecting the Nation's groundwater resources from contamination by fertilizers and pesticides and in doing so without jeopardizing the economic vitality of U.S. agriculture.
- o Water quality programs must accommodate both the immediate need to halt contamination and the future need to alter fundamental farm production practices.
- o Ultimately farmers must be responsible for changing production practices to avoid contaminating ground and surface waters. Federal and State resources can provide valuable information and technical assistance to producers so that environmentally sensitive techniques can be implemented at minimum cost.

- o Water quality is inseparable from water quantity. To manage water quality and nonpoint source pollution, the manipulation of water quantity must be understood.

A BRIEF HISTORY AND CONTEXT:

Involvement with water quality is not a new area of interest and concern for the USDA. Much of its work benefitted water quality, for example, the erosion control work conducted over the past 50 years, and assistance in animal waste management and salinity control. The USDA has had a role in implementation of nonpoint source control components of the 1972 Federal Water Pollution Control Act and subsequent revisions of this law. In addition, in the last several years, USDA has articulated water quality policy in the form of two departmental regulations, one on nonpoint sources and one on ground water quality. In the USDA's National Conservation Program, which directs the conservation programs of eight USDA agencies, the two top priority items are linked to water quality. These are as follows:

- Give top priority to reduction of erosion on agricultural land with emphasis on the implementation of the conservation provision of the Food Security Act of 1985, which requires protection of highly erodible croplands and of wetlands; and
- improve and protect the quality of surface and ground water by undertaking efforts to avoid harmful contamination from nonpoint sources and thereby maintain the quantity of water available for beneficial uses.

The President's water quality initiative is supplemental to existing programs. Its distinction arises from (1) its particular focus on agricultural chemicals and on groundwater contamination, and (2) the extensive degree of interagency coordination, collaboration and program integration required to successfully achieve its goals. It builds upon a USDA history of accomplishment, expertise and experience in research, conservation, education and extension programs that have led to the development and use of best management practices to protect soil and water resources in rural areas. USDA's established conservation programs and the activities carried out under the President's Water Quality Initiative are expected to mutually benefit and enhance one another.

OVERVIEW OF WATER QUALITY INITIATIVES:

The initiative is operating on a 5-year time horizon. The following principal USDA and cooperating State program agencies are contributing to the initiative:

- o Agricultural Research Service (ARS)
- o Agricultural Stabilization and Conservation Service (ASCS)

- o Cooperative State Research Service (CSRS) in conjunction with the system of State Agricultural Experiment Stations (SAES)
- o Economic Research Service (ERS)
- o Federal Extension Service (ES), in conjunction with State and County Cooperative Extension Services (CES)
- o National Agricultural Library (NALS)
- o National Agricultural Statistics Service (NASS)
- o Soil Conservation Service (SCS)

Each lead agency has is coordinating with ongoing or refocused programs of other USDA agencies, including the Animal and Plant Health Inspection Service (APHIS); Farmers Home Administration (FmHA); and Forest Service (FS).

These organizations will work to implement three output-oriented, functional components: (1) education and technical assistance; (2) research; and (3) database development. These components are underway concurrently. They are addressing a series of output-oriented and program support-building blocks which constitute the USDA's implementation strategy. Each of the three components and their elements are examined below.

EDUCATION AND TECHNICAL ASSISTANCE:

This component recognizes that there are positive steps to protect water quality which can be taken now with existing technology. Its outputs are:

Demonstrating effective voluntary strategies to address contamination problems

USDA agencies will cooperate in conducting a series of demonstration projects at sites across the Nation. The objective of the projects is to encourage accelerated adoption of appropriate technology by producers in order to achieve voluntary, cost-effective, and substantial reduction in the loadings of agricultural chemicals to the environment. The projects will demonstrate, for the soil, climate, cropping and farming practices in each project area, how quickly and effectively producers can modify their pesticide and nutrient inputs, conservation systems, tillage and management practices to reduce the movement of agrichemicals and waste products through soils and potentially to groundwater and surface water.

Eight projects will be initiated in FY 90; planning for them is underway. A total of 24 projects are anticipated. The results of the projects will be evaluated and applied elsewhere.

Meeting Water Quality Requirements Through Education and Technical Assistance

USDA will target, education and technology transfer efforts will be targeted to farmers, ranchers, foresters, and rural agencies who need

assistance in meeting specific State water quality requirements such as those developed for the water quality plans required by Section 319 of the Clean Water Act of 1987. SCS plans to initiate 37 Section 319 hydrologic unit water quality projects in FY90. In addition, USDA will provide assistance to producers to meet specific goals of State, multi-State, and regional water quality programs such as the Chesapeake Bay program and the Great Lakes program. USDA's goal is to help producers meet requirements without economic hardship.

We expect that State governments will adopt USDA standards and guidelines as the basis for their own. This will help to promote consistency in State programs for agricultural chemical management.

Expanding USDA and CES Staff Capacity to Deliver Assistance to Producers

USDA will enhance USDA and CES staff capacity for the planning, delivery, and analysis of water quality protection procedures and improved agricultural chemical and production management systems. We will update the Soil Conservation Service Field Office Technical Guides and other references and carry out organized professional training. We will equip field personnel with technical knowledge and ability to accomplish the education and technology transfer goals of the water quality program in every agricultural county in America. We expect to provide training to some 6,500 Federal and State employees in FY 1990.

RESEARCH

Research is the second component of the initiative. Although much is known about how to carry out agriculture while protecting water quality, there is also much that is not known. The research component will address the unknown through three major activities.

Developing Improved Methods for Sampling, Measuring and Evaluating Groundwater Contamination Problems

Research on agricultural chemicals in groundwater requires development of new, rapid and lower cost field and lab techniques for sampling and measuring contaminants and identifying their sources and flow paths. Development and application of such tools are thus among the initial priorities of research efforts. This work is needed to define more precisely the nature and extent of the groundwater contamination problem. The first set of improved methods for sampling and measurement will be installed in research sites during FY 91.

Conducting Fundamental Research on the Processes Leading to Groundwater Contamination

Development of improved management of agricultural production systems that prevent contamination of groundwater is dependent upon understanding the mechanisms that govern the persistence and movement of

agricultural chemicals through soil and geologic materials, and that govern how such chemicals become available in forms that readily move.

Research will help identify and understand the biological-physical-chemical processes that determine how agricultural chemicals change or persist in the soil and how they and their breakdown products move downward to enter groundwater. FY 1990 outputs include initiating fundamental research on priority water quality problems through a grant process and work on models to evaluate production systems for their effects on groundwater quality.

Developing Improved Agricultural Chemical and Production Management Systems

The ultimate goal of research activities is the development of practical new management systems that reduce environmental loading of contaminants from agrichemicals and waste products while maintaining agricultural productivity.

This component will improve existing and develop new, cost-effective agricultural systems to address water quality problems. Its initial focus is in the Midwest.

The first set of systems, based on off-the-shelf knowledge, will be produced in FY 91, and systems stemming from new research are expected in FY 93.

In addition to tools for research, USDA will make available to improve on farm techniques for inexpensive, rapid cleaning of pesticide containers.

DATA BASE DEVELOPMENT

This third major component involves two major activities.

Building Nationally Coordinated Databases on Agricultural Chemical Use and Related Farm Practices

USDA will develop comprehensive, consistent, periodic National data on agricultural chemical use, and related farm practices, and develop a system to link those data with the physical environment. This will provide the necessary basis for Federal agencies and State governments to assess the benefits, costs and other effects of current agricultural practices and to evaluate the consequences of alternative policies and practices for reducing any adverse effects of agricultural production on water quality.

A continuous cycle of commodity-specific, national surveys will be established and implemented to create cross-sectional and time-series data on farm use of agricultural chemicals and waste products. Survey instruments will be designed to concurrently collect data on related farm practices and physical attributes of the land.

A pilot survey will be conducted in FY 90 and a regular cycle of surveys will be defined beginning in FY 91.

Developing a U.S. Geographic Information System (GIS) for Agriculture and Water Quality

USDA will develop a digitized geographic information system for agriculture and water quality to link nationwide data and statistical information on agricultural productivity, land use, agricultural use, physical attributes of the land and surrounding watersheds, climate, and water quality. This system will support a variety of policy and program decisions.

This system will enable analysts to determine, on a National basis, the locations and relative intensities of potential water quality problems. Its development involves the expansion and merger of existing data bases. The system is expected to be operational by FY 94.

ADDITIONAL FEATURES OF THE INITIATIVE

We have now reviewed the major components of the USDA's Water Quality Initiative. There are a few more features which are of interest.

Economic, Social, and Technical Evaluations

Evaluations will be conducted at each stage of research, management system development, extension, and implementation to assure that new and demonstrated technologies and systems are practical and profitable and maintain productivity. Evaluations will be used to design incentive and education programs to assure widespread adoption of effective management systems.

Through this component, we will determine the economic and technical feasibility and expected consequences of producer adoption of new technologies and management systems before they are recommended. We will follow up to document, refine, and assess actual performance of programs in achieving adoption and water quality goals.

Public Information

Databases, scientific findings, educational materials, progress reports, and general information will be widely disseminated to appropriate audiences to assure that farmers, environmental groups, Federal and State legislators and program administrators, scientists and the general public are aware of agricultural chemical management and water quality program objectives, activities, findings, and accomplishments.

This activity will help educate the general public on issues of agriculture's relation to environmental quality, share scientific data, and gain community-wide understanding of USDA Water Quality Program goals.

A Water Quality Information Center

The Water Quality Information Center (WQIC) at the National Agricultural

Library (NAL) will support USDA's research, education, and information dissemination activities. Center staff will provide an information and referral service; strengthen the AGRICOLA database with water quality research and educational/training materials; enhance communication and information dissemination by maintaining an electronic bulletin board on water quality; and develop information products directed toward researchers, educators, farmers, and consumers. NAL will work closely with the land-grant community and other agricultural constituencies.

Major Workshops and Conferences

An Annual Research and Development Conference conference will be held during February of each year. The audience will include research scientists and administrators, education and technical assistance professionals, producers, agribusinesses, consumers, and other interested groups. Research and developmental results will be presented with specific effort made at the workshop to integrate results and identify those that are ready for timely transfer and users.

Interagency Coordination

USDA Water Quality Program activities are closely coordinated among USDA agencies and with the related activities of EPA, USGS and NOAA under the President's Water Quality Initiative. Coordination of the USDA Water Quality Program will benefit from related past and ongoing Departmental efforts in soil and water conservation, research public information, research, and extension, and will complement the aims of established programs such as those addressing integrated pest management and low input, sustainable and alternative agricultural systems.

It is clear from the preceding discussion that no single planned output from the USDA Water Quality Program is to be produced through the exclusive efforts of a single agency; all are multi-agency activities. Also, many of the program's major activities contribute to more than one set of planned outputs. This close integration of program components is predicated upon a network of interagency coordination mechanisms, many of which are in place and others of which are currently under development.

At the Departmental level, the Secretary provides overall direction for the Water Quality Program. Implementation of program plans will be the responsibility of the Department's line agencies. The Deputy Secretary has established a Working Group on Water Quality to coordinate all aspects of intra-Departmental programs relating to water quality, including the President's Water Quality Initiative. It consists of the Assistant Secretaries for Marketing and Inspection Services, Natural resources and Environment, Economics, and Science and Education or their designees. Also included are representatives of USDA agencies involved in water quality. Dr. Harry Mussman, Deputy Assistant Secretary for Science and Education is Chairman of the Group. In addition to the USDA agencies, the EPA, USGS AND NOAA will be asked to appoint representatives to the work group.

SUMMARY AND CONCLUSIONS

USDA has developed a coordinated and integrated water quality initiative which responds to the charge given by the President to protect ground and surface waters from potential contamination by agricultural chemicals and wastes. It combines the efforts of USDA agencies with those of EPA, USGS, NOAA and state and local government, farmers and others in the private sector to protect water quality while not jeopardizing the economic vitality of agriculture.

Involvement in water quality is not new for the USDA. The water quality initiative will focus USDA efforts at agricultural chemicals and on groundwater protection and will involve a higher degree of interagency coordination than has been used in past water quality activities. Outputs from the initiative will be accomplished through traditional USDA tools; research and education and technical assistance. In addition, data base development and evaluation are central elements of the initiative which will help measure accomplishments and point to areas where more work needs to be done.

USDA is confident that it will be able to meet the challenge of the President's water quality initiative, working with our partners in this endeavor.



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WATER QUALITY LEGISLATION: IMPLICATIONS FOR AGRICULTURE

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The general public as well as the farming community is highly concerned about the presence of agricultural pesticides and fertilizer residues in drinking water. Opinion polls and public action clearly demonstrate that water quality -- in particular, ground water quality with respect to agricultural production -- is high on the agenda of contemporary policy issues. (See: Gillroy and Shapiro, 1986; and polls cited by Batie, 1988.)

The issue will not go unaddressed. The 100th Congress alone introduced close to 50 legislative proposals addressing ground water quality (Zinn and Tiemann, 1989). There is little doubt that there will be new water quality legislation, whether within or outside the farm bill process. The question is what form(s) new legislation will take. There are many options, each with unique implications for agriculture.

At the present time, national water quality policy is mainly defined outside of the agricultural arena and largely relies on States' actions to meet national guidelines. Federal water quality legislation is administered primarily by EPA under authority arising from nonagricultural committees of Congress. Principal water quality policies with potential implications for agriculture are defined by the Safe Drinking Water Act and the Clean Water Act, both of which are administered by EPA, delegate responsibility for water quality program development to the States, authorize or direct the establishment of water quality standards, and can be used to withhold or provide Federal funds for activities shown to affect water quality. Other EPA programs related to the regulation of hazardous wastes, toxic substances, and pesticides also take water quality concerns into account and can affect agricultural activities.

States have become particularly active in proposing and implementing nonpoint source water quality programs, both in response to EPA requirements, and through independent action. State-level programs employ policy approaches that range from providing positive incentives for change in agricultural practices presumed to adversely affect water quality, to imposing liability or penalties for agricultural activities shown to degrade water quality (Batie and Diebel, 1989). An advantage of State control of water quality policy is that it can more easily accommodate local concerns and site-specific variation in the nature of the problem than can uniformly applied national policy. On the other hand, policy inconsistency from State to State creates problems for agricultural input suppliers, raises questions of equity within the agricultural sector, and increases pressure for uniform direction at the national level.

Policy Decisions to be Made in a Climate of Uncertainty

For the State and Federal legislators confronting policy options, there are numerous unknowns. We do know from a rapidly accumulating but scattered body of information that agricultural pesticide residues and nitrates are present in surface and ground water sources, including those used for drinking water (Environmental Protection Agency, 1988; Parsons and Witt, 1988). What we don't know is exactly how they got there or what their presence means.

We do not know what portion of agricultural chemicals detected in water comes from farm use or from lawn, garden, golf course or other nonagricultural uses. Of those residues arising from agriculture, we don't know whether the origin is predominantly of a point source nature (related to mixing, storage and disposal of agricultural chemicals) or of a nonpoint source, originating as residuals of chemicals applied to or naturally occurring in crop systems. We do not know when observed residuals originated. We do not yet know the magnitude, extent, or distribution of agricultural chemicals in ground water (though EPA is in the process of finding out). We lack understanding of the precise means by which agricultural chemicals can enter water systems, or the tradeoffs between ground and surface water quality. Finally, there is conflicting evidence about the degree of health risk posed by residuals at the levels detected in ground water.

This uncertainty is not cited as a basis for a "do nothing" policy stance. On the contrary, serious public concerns need to be addressed even if we do not yet have complete information on all dimensions of the problem.

What this lack of knowledge does mean, however, is that policy decisions will be made and legislation implemented without complete information on the benefits and costs of alternative policy actions. It will be very hard to estimate the value of actions aimed at reducing agricultural chemicals in water if we are not yet sure how they get there. In other words, we cannot, under these circumstances, do straightforward benefit-cost comparisons of legislative alternatives.

Nevertheless, the general economic implications for farmers of each of several types of possible legislation can be judged. Of special significance is the fact that the direction and strength of economic impact often depend upon unknown relationships or uncertain market conditions. The following reviews of voluntary, other nonregulatory, and regulatory approaches to water quality legislation identify the factors that are critical in determining ultimate implications for agriculture.

Voluntary, Nonregulatory Legislative Options

In the short-term, and in the context of the farm bill, legislative options addressing water quality will likely be nonregulatory and voluntary in nature. Voluntary, nonregulatory options can take a number of different forms. A brief review of the major implications of several generic forms follows.

Focused Research, Education, and Technical Assistance. Earmarking or redirecting funds for specific water quality or low-input agriculture research and education activities represents public investment in information that is expected to lead to voluntary change in future farm practices. This option recognizes the value of information to policy makers, program administrators, and farmers, as each makes decisions affecting water quality.

The most cost effective research program will likely be one that focuses on the development and extension of new technologies that possess lower costs, less potential for water contamination, and productivity equal to or greater than the current stock of agricultural chemicals. The USDA water quality program plan is aimed at doing precisely that (USDA, 1989). If it is successful, farmers who adopt resulting new, lower cost technologies or management systems stand to gain substantially. Those who adopt earliest will gain the most from additional earnings. Because commodity prices will drop if production costs go down, later adopters may gain little or no extra revenue, but would still benefit from any increase in water quality that arises from widespread adoption of new, environmentally benign production practices that maintain profitability.

Likewise, agribusinesses that quickly diversify to commercialize and capitalize on the availability of new, cost-effective, environmentally beneficial products and services will gain revenue. They may do so, however, at the cost of a loss of market share from businesses unable to accommodate the change in demand.

Consumers stand to gain not only from greater water quality protection, but also from lower food prices. This benefit, as well as the revenue gain to some farmers, is predicated on the capability of research to develop and extension to demonstrate methods that are superior not only in protecting water quality but also in improving farm income potential.

Targeted Acreage Reduction. A number of early legislative proposals for incorporation of water quality concerns into the farm bill involve amendments to the Conservation Reserve Program. Unpublished analysis by the Economic Research Service suggests that expanding or modifying the current Conservation Reserve Program (CRP) to target 10 million acres of cropland overlying or draining into vulnerable water systems would require a long-term transfer of \$8-10 billion from the public coffers to agricultural landowners. If annual set-asides were adjusted to compensate for reduced acreage, no near-term agricultural production or price impacts would be expected as long as export demand did not rise substantially. Under these circumstances, farmers who opted to retire cropland on which production posed an environmental threat would gain from the certainty of receiving an income acceptable to them in relation to what they might expect to receive from keeping the land in production. And, consumers would not face higher prices.

Many of these benefits of targeted acreage reduction could, however, be precluded if export demand for U.S. agricultural commodities rises by more than a newly limited American cropland base could handle. A diminished capability to respond to increased demand could accelerate a rise in food prices, reduce U.S. trade competitiveness vis-a-vis countries with greater capacity for rapid production response, and result in a failure to meet the true income potential of those who opted to retire land.

Cross-Compliance with Farm Program Eligibility. Requiring farmers to adopt specific well head protection or agricultural production practices in order to remain eligible for commodity, credit, and related farm programs imposes consistency across policy priorities. But the success of cross-compliance options in protecting water quality, and their implications for agriculture, both depend entirely upon uncertain agricultural market conditions. If commodity market prices are low, and reliance on farm programs as a supplemental income source is high, then cross-compliance would shift the costs of water quality protection to farm program participants, their input suppliers, and primary and secondary consumers of their output. On the other hand, if export demand and program commodity market prices rise, the attractiveness of farm program

benefits declines and water quality cross-compliance could become a disincentive for commodity program participation rather than a disincentive for particular production practices.

The appeal of program consistency is great. But, unlike the sodbuster, swampbuster, and conservation compliance provisions of the 1985 Food Security Act, no institutional arrangements exist to monitor water quality compliance. Thus, monitoring and enforcement of water quality compliance could represent a substantial new public cost.

Commodity Program Modification. It has been hypothesized that various aspects of current commodity programs may either encourage the use of agricultural chemicals in intensive production systems or discourage adoption by farmers of extensive or low input agricultural systems. Thus, among water quality legislative proposals under formulation are a range of minor and some major changes in commodity program provisions.

One set of possibilities under discussion would modify the current provisions dictating how commodity program base acres may be used. Since 1981, commodity program participants have had limited flexibility -- either the designated program crop has to be planted on base acreage to maintain a production history, or a portion of base acreage is set aside during annual acreage reduction programs. Proposals to increase base flexibility would allow a greater variety of uses of base acreage and are presumed to contribute to water quality protection by facilitating the adoption by commodity program participants of crop rotations that use lower average levels of agricultural chemicals.

Farmers would undoubtedly gain from increased base flexibility. The option would facilitate production response to market signals arising from changes in alternative crops' prices. However, if those signals induce increased production of commodities that pose high relative potential for water quality problems, and farmers' choices are completely open, the option might not have much effect on water quality.

More sweeping changes in commodity programs are also on the grand list of possible legislative proposals. Eliminating production-based price and income supports would certainly change production patterns. Because land would be used less intensively in the absence of farm programs, the potential for ground water contamination from agricultural chemicals might also be reduced. However, in the absence of farm programs, more land would be used to produce less output, creating the potential for greater soil erosion and runoff into surface waters.

While the net effects of farm program reform on the sum of ground and surface water quality are hard to determine, implications for agriculture are more straightforward. Because sweeping changes in farm programs would reduce excess capacity in the agricultural sector, some farmers would be displaced, agribusiness revenues would drop, and price volatility could increase.

Other Nonregulatory Options

Several States have placed taxes on pesticides or fertilizers as a way to raise revenues for monitoring water quality or funding research on water quality protection. The use of agrichemical taxes or soil erosion fees has also arisen as a possible legislative approach to providing market incentives for change in production practices. This approach is nonregulatory in that it does not require a change in practices. But it is not voluntary because the tax or fee would be unavoidable by any means other than eliminating the input or effluent.

The nature of demand for agricultural chemicals is such that tax rates capable of reducing use rates would likely have to be quite high -- perhaps as much as 50 percent of before-tax purchase price. Tax rates at that level, or effluent fees at any level, would raise the cost of producing agricultural commodities. Costs would go up more for producers of commodities that require greater rates of agrichemical input, producers in regions characterized by relatively higher pest populations, or producers whose land is highly erodible. An across-the-board tax or fee structure would not necessarily discriminate between producers whose operations pose high and low potential for ground water contamination.

Much of the increased cost of production for domestically consumed products would be passed on to consumers, making producers of those commodities no worse off, on average, than in a without-tax situation. Such is not the case with producers of export commodities. Increases in the cost of production of those commodities could decrease trade competitiveness, with aggregate loss of revenue. Manufacturers and suppliers of taxed inputs would also experience a loss of revenue if tax rates were high enough to decrease demand for their products.

Regulatory Options

In the case of taxes, fees, and other market incentives, producers would always have the option of paying the tax or fee and continuing to utilize familiar production practices, though at higher cost. Under legislation that absolutely bans or restricts particular practices, this choice would not be available.

Should voluntary or other nonregulatory actions fail to materialize, or fail upon implementation to achieve tangible results, new regulatory approaches will be increasingly likely in future. The cost of regulations that dictate or restrict production practices are distributed unevenly among farmers; those most reliant on restricted practices are most heavily affected. Also, if legislative approaches to water quality regulation vary from State to State, farmers in certain localities, States, or regions would be more affected than others, suggesting further change in the competitive advantage that some farmers currently enjoy in the production of certain commodities.

If water quality regulation was enacted nationally or became common across agricultural States, the constraints imposed on individual farmers could manifest themselves as changes in the performance of the agricultural sector. In general, widespread, stricter water quality regulation would likely: (1) raise commodity and consumer prices; (2) reduce demand for the services of agricultural input suppliers; (3) result in less business for the food processing industry; and (4) reduce U.S. trade competitiveness, along with changes in the distribution of farm income.

These potential consequences of water quality regulation would, of course, be balanced against the value of gains in water quality. But lack of understanding about the precise nature of relationships between agricultural practices and water quality will make it difficult to assure that a reasonable tradeoff between agriculture and water quality is achieved through regulatory actions.

Summary and Conclusions

The voluntary, other nonregulatory, and regulatory options reviewed herein do not exhaust the list of water quality legislative approaches that could be taken or, in fact, are in place in some States. For example, the State of Connecticut has established legislation that makes any party, including farmers, found responsible for drinking water quality degradation liable for the costs

of restoring water quality or providing alternative sources. The possibility of providing subsidized yield insurance for farmers wishing to reduce agrichemical input levels has been proposed as another voluntary option that would require new legislation. Numerous other proposals may arise as attempts are made to assure that public concerns are addressed in ways that maintain the productivity and performance of the agricultural sector.

Nevertheless, several concluding points may be drawn from the limited set of potential water quality legislative options examined here. First, both the value of water quality gains and the implications for agriculture of any nonregulatory water quality legislative option depend to some degree on the strength of commodity market incentives to increase production.

Secondly, it is apparent that legislation aimed at protecting or improving water quality can either provide new opportunities for farmers, or constrain farmers' activities or choices, depending entirely upon the form that future legislation takes. Voluntary, nonregulatory options have the greatest potential for both protecting water quality and expanding income opportunities for farmers. The possibility that the costs to farmers, consumers, and other agricultural sector participants may exceed the value of water quality gains is greater for the case of broadly imposed regulation legislated under existing uncertainty about the precise linkages between agriculture and water quality.

Finally, given the strength of public concern about agriculture's potential contribution to water quality problems, preventing or slowing the future rate of implementation of water quality regulations will probably require proof in the short term that voluntary actions or nonregulatory legislation are clearly effective in protecting water quality. Thus, the agricultural community's stake in the success of new research education, and technical assistance efforts is high, and its active participation in voluntary water quality protection efforts is critical.

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WATER QUALITY

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As population densities increase, society's concerns will be magnified. Foremost among these concerns are environmental and food safety. In regard to environmental stewardship concerns, it is appropriate that the United States Department of Agriculture has initiated a comprehensive program to provide the knowledge and technical means for an agricultural response. It is important that this effort encompass all segments of the food and fiber production system. Agrichemical management must relate to the total production, storage, distribution and use of agrichemical and plant nutrients, and not just the specifics of chemical use at the farm level. Agricultural production must be maintained, and we must strive to avoid economic hardship and produce a safe, economical food supply.

Industry has accepted a leadership role in assuring society that the actions of this industry and the production practices of our food system do not detract from the quality of our nation's environment. Production agriculture, and those industries that provide agricultural chemicals, must become involved with the overall food industry, and adopt as a goal "to produce a bountiful, safe, high-quality food supply in a manner that does not detract from the ability of future generations to achieve the same goal." This goal is achievable and realistic if all segments of society commit to working together.

Groundwater is considered a national indicator of the degradation of the environment. As a result of the dependency of rural America on groundwater for drinking purposes, it is particularly critical as a rural resource.

Unfortunately, the study of groundwater is an infant science. We do not completely understand the movement of groundwater, or the ability of the soil to filter contaminants before they reach underground water resources. Research is essential to expand the understanding of the mechanisms which control the movement of chemicals and plant nutrients through soil or other geologic formations.

Because of this limited understanding, we are subject to mistakes in policy action that may result from emotionally-driven initiatives plus, there may be instances of contamination which result from a lack of understanding of the consequence a particular action or policy may cause. Today, concern regarding

the quality of our nation's groundwater has become a cause celebre', and emotion is dictating decisions that more accurately should be based on scientific data and the needs of our food industry. The limitation of our knowledge does not, however, negate the responsibility of the agricultural industry to assure that adequate safeguards are in place. There is need for a united effort between production agriculture, government, industry, and those with a genuine concern for the environment, to work together in a harmonious relationship to assure that society's goals are addressed. Government should serve the important role of generating needed information to provide consistent guidance for the handling, storage and use of agrichemicals.

Today, there are a number of perceptions which are given credence even though lacking factual support. These perceptions are adding to the emotion surrounding environmental issues, and include: 1) the belief that non-organic nutrients differ in chemical composition from naturally occurring nutrients, 2) that food grown with the use of crop protection chemicals is less healthful than foods grown without the use of crop protection chemicals, 3) the belief that modern agriculture practices are more abusive of our soil and water resources than practices utilized by production agriculture in the past, and 4) that agribusiness industries have persuaded the American farmer to use excessive or un-needed agrichemicals. Of equal concern is the apparent position of USDA as projected in the Water Quality Program Plan that, although it is admitted that a void of information exists, a reduction in the use of chemicals is the predetermined objective.

Those perceptions tend to undermine the confidence of the American consumer. American agriculture produces a fantastically abundant food supply that is safe, high-quality and economically-priced. This is an accomplishment that is the envy of consumers throughout the world.

It is alarming that we, as a nation, seem to have forgotten that we live in a world that continues to be plagued by extensive hunger and human suffering caused by malnutrition. This is not to suggest that we should abdicate our responsibility for maintaining assurances that groundwater contamination is minimized, but, rather, that it would be a tragedy if regulatory or legislative actions were allowed to occur which eliminate or severely restrict the use of specific products when additional data would have proven these actions to be inappropriate. It is equally important that there be no attempt to camouflage existing problems or deny their existence. Now is an appropriate time for a reasoned approach that utilizes the best available information and acknowledges the need for extensive research to assure that our commitments are fulfilled, not only to this generation, but to those who will follow.

Industry has assumed a strong role in addressing the concerns of groundwater contamination. When speaking of industry, I include not only those who manufacture and distribute fertilizers and agrichemicals, but also production agriculture and all segments of society which utilize various products for the convenience or enhancement of mankind.

Today, industry is providing substantial leadership and investment to assure that appropriate safeguards are in place. Industry is making a significant investment individually and cooperatively through various organizations to develop guidelines for the safe, efficient utilization of fertilizer and the many agrichemicals in use today. This is not a reactive response, but is indicative of the willingness of industry to be pro-active in their attitudes. We have progressed beyond the point of suggesting that problems do not exist. I hope we have progressed beyond the point of acrimony between various segments of the industry and society. In short, the time for finger-pointing is past, and the time for constructive discussion and debate is here. Environmental stewardship is not solely a government problem; however, government has a significant role in data base production, education, and in assuring uniformity in regulatory response. We must all work together.

It may be of interest to note some examples of industry's acceptance of responsibility, not only for the safe handling and storage of agrichemicals, but also for the safe usage of these products plus the industry's effort to understand the consequences of possible chemical introductions into the water system. Industry is committing millions of dollars to extensive research efforts that are aimed at assuring the safety and effectiveness of new and existing products before they are considered for commercial production.

Additionally, the major agrichemical companies have taken a number of steps directed toward the distribution and use of agrichemicals. A few examples are: Monsanto's D.E.T.A.I.L. program which is an excellent educational effort regarding the handling and storage of agrichemicals; Sandoz Crop Protection Corporation's agrichemical training program which has been in existence for over 2 years; and Ciba Geigy and Du Pont who are providing safety training and worker right-to-know workshops designed to alleviate environmental problems and create an awareness of appropriate response when accidents occur. A number of companies, including MOBAY Corporation and Uniroyal, have developed various conferences to help create an understanding of environmental issues.

Most recently, there has been a concerted effort by various agricultural trade organizations to address environmental issues. The recently organized Agriculture for a Clean Environment (ACE) program, developed by the National Fertilizer Solutions Association, is an example of one such activity. The program's purpose is to assist the retail dealer in operating his facility in a manner which achieves society's environmental goals. In 1988, NFSA published the second edition of the "Onsite Product Containment Guidelines for Fluid Fertilizers and Agrichemicals." Many state fertilizer and agrichemical associations have worked with regulatory agencies to develop programs for containment of spills and leaks in order to promote improved standard practices within the industry. The proliferation of articles regarding the environment in the various agri-industry publications is indicative of the willingness of this industry to address critical issues in a pro-active, aggressive manner.

The retail dealer must be given increasing recognition for the role he will play in safe handling and distribution of fertilizer and agrichemicals. Many retail dealers have constructed, or are considering the construction of,

containment systems that will eliminate the opportunity for accidental loss of product into the water system. There is, however, a complete lack of uniformity among the states in the requirements, if any, regarding diking and site containment.

Regulation of the manufacture and distribution of pesticides and chemicals is under the jurisdiction of the U.S. Environmental Protection Agency. Under the proposed USDA Water Quality Program use levels, research and education at the farm level would continue to be the domain of USDA. And, finally, site containment and regulations regarding storage and handling of agrichemicals at the dealer level are left to the discretion of the individual states. This whole scenario pleads for close cooperation and a level of communication between all branches of government and all segments of industry that has not been experienced to date, nor is it suggested in the USDA plan.

As we look at groundwater contamination, we must wonder at the source. Underground storage tanks, septic tanks, solid and hazardous waste disposal, improperly constructed wells, chemical spills, and mishandling of fertilizer and agrichemicals are but a few examples of activities which can and have resulted in groundwater contamination. From an agricultural standpoint, we must be concerned with non-point source contamination of our groundwater. Although there is concern associated with the utilization of agricultural chemicals in crop production practices, the potential for contamination is far greater from point source contamination. The mounting evidence indicates that point sources of fertilizer and pesticides may be the predominant problem rather than non-point sources.

Currently, nitrates and agrichemicals are finding their way into groundwater and, in some instances, are in concentrations which cause concern from both a public health perspective and an environmental perspective. Although uncertainties exist regarding source and environmental impact, the finding of these products is sufficient evidence that we must begin to address this issue.

Education and awareness must be given high priority in our programs to protect groundwater quality. Education at the farm level utilizing "Best Management Practices" provides the best system of timing, placement and levels of nutrient availability for optimum yield, and minimum potential for movement into the groundwater system. Education cannot be limited to the farmer, nor should the Extension Service be considered the sole conduit of information to the farmer. The dealers of the '90s are prepared to assist their customers in implementing measures which are agronomically, economically, and environmentally sound. The retail dealer is the last contact with the end user before purchase and use decisions are finalized, and should be considered as a valued member of the education process. Furthermore, education regarding the safe handling and disposal of chemicals and chemical containers must be expanded at both the farmer and dealer level.

Of equal importance is developing research activities to provide the necessary data base guiding regulatory action for the elimination of point source contamination. Further research is needed to identify methods for delivering

nutrients and pesticides to the target organisms more efficiently and develop more environmentally benign nutrient and pest control products. Joint private and public activities must be developed to address the issues of water well abandonment. Well-head protection programs for public water supplies and regulatory actions that provide consistency regarding containment measures to avoid contamination from accidental spills must be implemented.

Finally, we must determine that, as a society, there is need to balance potential risk with the needs of an adequate food production system. Emotion must yield to scientific knowledge and an understanding of hydrologic processes. And, most important, we must learn to work together in a responsive, pro-active manner to earn the confidence of the public, with the knowledge that ours is a system concerned for the safety of today's food supply, and equally concerned for adequate food produced in a manner that safeguards the interest of future generations.

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WORLD AND U.S. OUTLOOK FOR SUGAR AND SWEETENERS

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INTRODUCTION

Ladies and gentlemen, it is both a pleasure and a privilege to represent the U.S. Department of Agriculture in addressing the Sugar and Sweeteners Session of Outlook 1990. The global and U.S. sweetener markets have passed through a tumultuous decade in the 1980's in terms of prices, the reshaping of demand, and the emergence of new trends in production. This current marketing year --1989/90-- which bridges both decades, is displaying an intensification of trends that emerged earlier in the 1980's, as well as signposts as to where sweetener markets may go in the 1990's. Overlaid on the increasing globalization of sweetener markets, are the prospective impacts that policy decisions to be made in 1990 in Geneva on GATT and in Washington on the U.S. Farm Bill will have in shaping sweetener markets during the last decade of this century.

The purpose of this paper is to provide you with USDA's analysis of world and U.S. sweetener markets -- both the current situation, a capsule review of the 1980's, and prospects for the 1990's. While policy decisions will no doubt be pivotal to the direction sweetener markets may take in the coming years, my remarks about the 1990's will focus on the prospects which innovation and new technologies offer in shifting sweetener consumption and production to new levels and reshaping their composition.

WORLD SUGAR OUTLOOK

Stocks and Prices

Despite continued growth in world sugar production, faster-growing consumption is chipping away at stocks and setting the stage for

higher prices. Global consumption likely will exceed production for 1989/90 for the fifth straight year. As a result, global stocks by the end of the 1989/90 marketing year are likely to be their lowest since 1980/81.

The contraction in global stocks, in part, is reflected in stronger prices this year. Monthly average raw sugar prices (f.o.b. Caribbean, Contract No. 11) have ranged from 9.7 cents a pound in January to 14.4 cents in October, and refined sugar prices (f.o.b. Europe, London Exchange Contract No. 5) have increased from 12.6 cents a pound in January to 22.5 cents a pound in August, before dipping to 18.0 cents in October. The run-up in prices in recent months, particularly for refined sugar, in large part reflects large purchases by Mexico and Indonesia, the unexpected entrance of the Soviets and India in the world market, and the lack of exports from Brazil--the world's second largest exporter of refined sugar. With prospects of improved beet sugar output in Western Europe, the Soviet Union, and Eastern Europe this fall, world refined sugar prices have begun to soften somewhat, but current prices remain about 50 percent above the level of a year ago. Moreover, spot raw prices continue to be strong averaging 15.2 cents a pound for the first-three weeks of November.

Though refined and raw sugar prices could both soften in the near term, the tightening of the world production and consumption balance, reflected in diminishing stocks suggests that significantly higher prices are possible. The USDA stocks-to-use ratio at the end of 1989/90 is forecast at slightly under 17 percent, 2.3 percentage points below the ratio for 1980/81 when prices averaged 22.4 cents a pound. However, a further strengthening of world prices could choke potential increases in global sugar consumption, especially in developing countries, such as China and India. Both are short of foreign exchange to supplement domestic supplies with higher-priced imports. Also higher prices could stimulate some further expansion in world sugar output in 1990/91.

Global Consumption

Global sugar consumption is forecast to rise about 1 percent in 1989/90 to a record 108.1 million metric tons, raw value. Much of this increase is being sustained by population growth in the developing world, while sugar use in the United States, Eastern Europe (including the Soviet Union), Western Europe, and Japan is either fairly stable or declining. In three of the world's most populous countries, China, India, and Brazil, the combined sugar use for 1989/90 is forecast at 25.5 million tons, nearly one-quarter of global consumption and up 300,00 tons from 1988/89 estimates.

World sugar consumption has grown at a fairly steady pace of about

2 percent a year over the past decade. Much of the growth has taken place in developing countries in Latin America, Africa, and especially Asia reflecting improved availability of domestically produced sugar in many countries and the increased demand associated with rapidly expanding populations. Consumption per capita in Asia rose about 2 pounds in the 1979-87 period. However, sugar per capita consumption across a wide range of developing countries remains well below saturation levels. Even leading consuming countries such as China, India, and Indonesia have per capita sugar consumption under 15 kilograms. In many of the countries of Sub-Saharan Africa, consumption remains well under 10 kilograms, compared with the 35 to 40-plus kilograms in Western Europe.

In the developed economies of Western Europe, North America, and Japan, sugar consumption, which was already at near-saturation on a per capita basis in the late 1970's either stagnated or declined during the 1980's because of low population growth and the sharp expansion in the availability of competitively priced substitutes, primarily high fructose corn syrup (HFCS). In the European Community (EC) sugar consumption has remained relatively stable at about 12 million tons over the last decade with per capita levels between 38 and 40 kilograms. Alternative sweeteners such as HFCS have had limited impact owing to production controls, although use of high intensity or low caloric sweeteners is expanding rapidly in Western Europe reflecting the lack of current production controls and heightened diet awareness.

In Eastern Europe and the Soviet Union, sugar consumption has trended upward over much of the 1980's. Combined with a population increase of 25 million over the last decade and lack of alternative sweeteners, the Soviet Union has one of the highest per capita use levels in the world (48 kilograms) and is expected to use 13.9 million tons in 1989/90. USDA's 1989/90 consumption forecast for the Soviet Union is actually down about one-half million tons from the 1986/87 record, largely reflecting the current rationing of sugar throughout the country and the reduction in the use of sugar for the unauthorized production of alcoholic beverages.

Government pricing policies have also been an important factor influencing consumption trends during the 1980's. Many governments insulate domestic markets from world prices and follow either a cheap or expensive retail sugar policy depending on policy goals. The government of Thailand, for example, in an attempt to keep farm prices of cane at an attractive level, has maintained the domestic wholesale and retail prices of sugar at the same high level since 1980. This policy of high internal prices has dampened demand growth, but spurred increased production and the volume of production surpluses for export. In contrast, Brazil in early 1986 froze prices of sugar but not wages so that real prices of sugar by midyear had declined 40 percent. The result was a 17 percent surge in consumption of sugar during 1986/87.

Global Production

World sugar production in 1989/90 is forecast at a record 105.7 million tons, raw value, up slightly from the revised 1988/89 estimate, but 2.4 million tons less than consumption. Since mid-year, developments in several pivotal countries have significantly influenced the global supply/demand situation and prices for the last quarter of 1988/89 as well as prospects for 1989/90. Interest has been particularly intense in the production outlook for the world's major importing countries, the USSR and China, and the crop prospects in Cuba and Brazil, leading producers of surplus sugar for export.

To focus just on Brazil, sugar production and export plans by one of the world's leading sugar exporters have both been a matter of considerable importance and uncertainty. This is of particular interest to the United States currently as Brazil has been allocated the third-highest import quota, but has shipped only 51,860 short tons or 20 percent of the enlarged quota announced September 12 and no sugar since the end of July. For 1989/90, the sugar production forecast has been reduced 7.4 percent from the June forecast to 7.5 million tons, the lowest in a decade, as heightened demand for cane for fuel alcohol lowered the availability of cane for sugar. With a 1.5 percent increase in domestic consumption foreseen, the 1989/90 forecast for sugar exports is now expected to be at a 15-year low of 1.3 million tons.

There is the prospect that USDA's export estimate could be revised downward in the near future. One of the key decisions in Brazil will be how much cane to divert to fuel alcohol production. Of the 13.3 billion liters originally projected for 1989/90 output, only 12.5 billion liters may be produced. Although the Brazilian government is attempting to moderate demand by reducing the alcohol content in gasoline, introducing gasoline as an ingredient in fuel alcohol, and implementing new pricing measures, alcohol shortages could materialize in 1990. In preparation for this possibility, Copersucar, the largest Brazilian sugarcane and alcohol producers' cooperative, reportedly could import 93 million liters of wine alcohol from the European Community. Moreover, although Brazilian sugar exports were privatized in June, the authorization to export continues to reside with the government's Sugar and Alcohol Institute (IAA).

Turning back to global sugar, aggregate production in the decade 1978/79-1988/89 increased almost 20 percent. Cane sugar production rose 22 percent and beet sugar nearly 13 percent. Cane sugar now accounts for nearly 65 percent of overall world sugar output compared with about 63 percent in the earlier period.

The increase in world cane sugar production in the last decade was achieved through a 36 percent expansion in harvested area; cane sugar yields per hectare actually fell by almost 10 percent. In

contrast, the higher beet sugar output came from a 9 percent improvement in yields, while sugarbeet harvested area actually fell 4 percent in the period. Higher beet sugar productivity reflects the more-capital-intensive agriculture in the Northern Hemisphere where most sugarbeets are grown, and the greater investment over the years in research into improved seed varieties, innovations in agronomic techniques, and improved refining technology.

World sugar production is highly concentrated among a few producers. Although sugarbeets and sugarcane are among the most widely grown crops, with about 110 countries cultivating either one or both sugar crops, the world's top ten producers (including the EC) in 1988/89 accounted for nearly 70 percent of the total, and the EC, India, USSR, Brazil, Cuba, and the United States--the top six producers--produced 54 percent. The two leading beet sugar producers, the EC and the Soviet Union, produced a total of nearly 24 million tons of beet sugar, accounting for nearly two-thirds of the world's beet sugar and more than one-fifth of total world sugar production.

The leading foreign cane sugar producers are India, Brazil, Cuba, China, and Australia which together produced 35.7 million tons of cane sugar in 1988/89, representing about one-half of global cane sugar production and one-third of total world sugar production. The United States is the only country in the world which is both a major producer of cane sugar and beet sugar, ranking as the world's eight-largest cane sugar and third-largest beet sugar producer. (China is also a sizable producer of both beet and cane sugar and has a total sugar output forecast at 5.3 million tons in 1989/90).

The past decade has seen a drive toward greater self-sufficiency in sugar production by several important traditional sugar importing countries. Some of the countries implementing import-substitution policies in order to conserve foreign exchange have been the oil-exporting countries such as Mexico, Venezuela, and Indonesia as well as the oil-importing countries of Sudan and Chile. Production of sugar in these five countries are forecast at 7.1 million tons in 1989/90, a 54 percent increase from 1980/81.

World Sugar Trade

USDA's forecast for global exports in 1989/90 is 28.3 million tons, up over 860,000 tons from our September forecast. Exports have been stimulated by high world sugar prices, which have been spurred by the failure of production to increase sufficiently to meet anticipated demand growth in countries such as Canada, Venezuela, India and Malaysia. Imports have been revised upward by almost 830,000 tons from the September forecast. The 1989/90 outlook, which shows imports in excess of projected exports by 1.4 million

tons, is illustrative of the tightness of the market, and could portend higher world prices.

Import demand is being generated largely by both traditional buyers such as the Soviet Union, China, and Japan, and non-traditional ones such as India and Mexico. Demand for refined sugar has been particularly strong, reflected in the price differential between whites and raws of nearly 10 cents a pound. India and Mexico are expected to be major purchases of refined sugar in 1989/90.

Thai exports, revised upward by 400,000 tons from the September forecast due to booming production, will again play a crucial role in satisfying increased import demand in Asia. EC shipments (including intra-EC trade) are forecast at over 5.6 million tons, 281,000 tons higher than the September forecast. Brazilian export volume, which as mentioned, is forecast at 1.3 million tons, is susceptible to government policy which explicitly recognizes the priority of domestic sugar and fuel alcohol requirements over exports. Australia's exports are forecast at a record 2.9 million tons, reflecting continued expansion in production. Noteworthy is Australia's recently signed supply agreement with the Soviet Union for 1.5 million tons total over the next five years. Perhaps this is a signal that the Soviets may be reducing somewhat their dependence on Cuban sugar. Australia plans to expand production in the 1990's, and could be producing close to 4.5 million tons by the mid-1990's according to Australian sugar industry officials.

The volume of world trade has been relatively stable over the last decade, averaging 28.5 million tons of raw and refined sugar annually. Refined sugar imports, after doubling in volume from the mid-1970's to the late-1970's, have been relatively stable at around 10 million tons annually, accounting for about one-third of global trade. Raw sugar imports have displayed greater volatility during the decade, ranging from a high of 20.9 in 1981/82 to a low of 17.1 million tons in 1986/87. These changes reflect the fact that most sugar consumption growth is coming from domestically produced sugar, and so global imports in percentage terms has actually declined from 31.6 percent of total consumption in 1980/81 to an estimated 27.5 percent in 1989/90.

The lack of growth in imports also is due to the lower level of raw sugar import requirements in the United States and Japan, increasing self-sufficiency in a number of countries, and the partial replacement of sucrose by other sweeteners. Despite contraction in import needs in recent years, both the United States and Japan still rank among the world's top five importers along with the USSR, China, and the EC, which combined account for about one-half of global imports annually, down five percent from a decade ago. Developing countries like China, Indonesia, Nigeria and Mexico now are more important to world trade than they were a decade ago; and developing countries, especially North Africa and the Middle East, take about two-thirds of the 10.0 million tons of

refined sugar imported annually.

While the composition of import markets has been changing in terms of the level of imports by key countries, sugar exports have been characterized by an increased concentration of trade among the world's four leading exporters--Australia, Brazil, Cuba, and the EC. When Thailand, an emerging export power through the decade, is added to the group, the five countries (including the EC) accounted for 70 percent of world exports in 1988/89 compared with 60 percent a decade earlier. Australia and Cuba are the dominant exporters of raw sugar. Australia and Thailand have a comparative advantage in shipping sugar to growing markets in the Far East and Oceania. The bulk of Cuban exports still go to the USSR and other centrally planned economies in Eastern Europe and China under special trading arrangements.

World Sugar Prices--Perspective

Current oscillations in prices are not unusual for sugar; historically the commodity has been one of the world's most price-volatile, with periods of high prices for 1 or 2 years followed by longer periods of low prices. The past decade had been no exception with world raw sugar prices peaking at 41 cents a pound during October 1980, second only to the historic high of 57 cents a pound in November 1974, and then falling to a low of under 3 cents a pound in mid-1985. Prices are again on an upward trend up from a calendar year average of 6.1 cents in 1986, 6.7 cents in 1987, and 10.2 cents in 1988. Prices in mid-November are currently about 14.5 cents a pound.

Increases in production capacity during the high price phase of a "sugar price cycle" take several seasons to be absorbed by relatively steady but slow consumption growth. Processing facilities are expensive to construct and require large size to capture scale economies. Consequently, once in place, there is a strong incentive for plants to be fully utilized to spread out fixed costs. After 6 to 10 years of low prices and slow growth in consumption, world sugar production typically catches up with processing capacity. At this point, a disruption to production triggers an explosive price rise and the sugar price cycle begins anew. Since 1950, world sugar price "spikes" have occurred five times: during 1950-51, 1957, 1963-64, 1974-75 and 1980-81.

Some price forecasters believe world prices are headed for another "boom" period. Although the world sugar stocks-to-use ratio as calculated by USDA is estimated to have slipped below 20 percent in 1988/89 for the first time since 1980/81, some analysts counter that production is not yet pressing close to capacity--there is an estimated 120-130 million metric tons of global processing capacity--implying a comfortable margin for another 3 years or so.

Moreover, certain structural changes in the sugar market have softened its potential volatility. On the demand side, starch and low-calorie sweeteners are both current and potential competitors of sucrose, and likely will dampen price run-ups. In addition, developing countries, with less money to spare, now dominate sugar import markets and are more sensitive to price rises.

Refined beet sugar production and trade have grown in the last decade, with a faster supply response to production shortfalls than sugarcane and computerized electronic systems are much faster in market intelligence and analysis. Brazil, in particular, is foreseen as an important player. With installed capacity to produce 10-11 million tons of sugar annually as well as 16 billion liters of fuel alcohol, once it gets its long-term sugarcane policies in place coupled with its increasing self-sufficiency in domestic oil production, it will have a unique capacity to switch from fuel alcohol production to sugar exports if that option seems viable. Structurally, then, potential price peaks are likely to be lower and of shorter duration than in the past.

U.S. SUGAR OUTLOOK

Like the world market, the U.S. sugar market is at somewhat of a turning point. Rising production combined with declining consumption to squeeze imports fairly steadily since import quotas were introduced in 1982. Quota sugar imports dipped to under one-million tons in 1987/88. A modest recovery in consumption and a drought-reduced 1988 crop permitted imports to expand somewhat this year. Effective Monday, November 27, Secretary of Agriculture Clayton Yeutter announced that the current quota (January 1, 1989 through September 30, 1990) would be increased 272,915 metric tons (300,835 short tons) to 2.26 million metric tons (2.49 million short tons) because of a production shortfall and unexpectedly low stocks at the end of the fiscal year, September 30, 1989.

Sugar Production

U.S. beet and cane production for crop sugar 1989/90 (September-August) is now forecast at 7.0 million short tons, raw value, only slightly above last season's weather-reduced crop of 6.9 million. Cane sugar production is expected to reach 3.3 million tons from 28.9 million tons of cane harvested for sugar (an additional 1.4 million tons cane will be harvested for seed). The production forecast for cane sugar is only slightly below 1988/89, because the expected record outturn in Louisiana is likely to be offset by a sharp contraction in Hawaii's crop which has been hit by poor growing and harvesting conditions. Beet sugar output from 26.0 million tons of beets is forecast at 3.7 million tons, up 163,000

tons from the 1988/89 drought-reduced crop. However, this forecast is 225,000 tons below the initial forecast in June, and 75,000 tons lower than the forecast in September, largely reflecting unfavorable early-summer growing conditions in the Red River Valley of Minnesota and North Dakota as well as generally disappointing yields in growing areas in the Great Lakes, the Plains, and Mountain States.

An estimated 1.3 million acres of sugarbeets are expected to be harvested in 1989/90, up 1.7 percent from the previous season and 18 percent more than a decade ago. Based on USDA's crop report for November, national average yields are estimated at 19.6 tons an acre and total sugarbeet production is forecast at 26.0 million tons. Beet sugar yields and tonnage are expected to be up only 2.6 percent and 4.6 percent, respectively, from the 1988/89 crop which was 11.6 percent below 1987/88.

Cane harvested for both sugar and seed is expected to set a record for 1989/90 at 862,700 acres, up 2.0 percent from 1988/89 and 17 percent higher than a decade ago. Yields for the total cane crop were put at 35.2 tons per acre in the new crop report, and total sugarcane production is estimated at 30.4 million tons.

Since about 52,000 acres, or about 1.4 million tons of sugarcane, are likely to be devoted to cane for seed, about 28.9 million tons of cane would be used for sugar production--a record amount. Assuming sugar is recovered from cane at a rate of 11.0 percent--just below the most recent 5-year average--a cane crop this size would yield 3.3 million tons of sugar, slightly under last year's record. These crop year production estimates and forecasts of the 1990/91 crop sugar output would translate to a 1989/90 fiscal year production of 7.08 million tons, comprised of 3.73 million tons of beet sugar and 3.35 million tons of cane sugar. This production forecast is 5.5 percent above the revised estimate for 1988/89 of 6.71 million tons which was reduced owing to the lower than expected outturn during the July-September quarter from Hawaiian cane and the reduced volume of an early beet harvest.

Analyzing U.S. sugar production over the course of the 1980's, some important trends emerge from the data. U.S. sugar production has expanded by above one-fourth, a rate only slightly above that of world production, which has grown by a fifth. Since 1982/83 when import quotas went into effect, U.S. output rose by 25 percent to a record 7.33 million tons in 1987/88, and have fallen less than 6 percent from that plateau during the two recent weather-plagued production years reflecting expanded area and upward-trending recovery rates.

Beet sugar production has expanded more rapidly than cane. From 1982/83, beet sugar output has risen over one-third, while cane sugar is up about 8 percent. In both cases, significant area expansion has been complemented by record sucrose recovery rates,

though beet and cane yields in the field have shown little improvement. The sharp improvement in beet sugar yields, according to experts interviewed by USDA, reflects introduction of improved seed achieved by heightened investment in research and development (R&D) including introduction of higher yielding breeding material from Europe; better agronomic practices, such as one-third higher stand populations (from 25,000 to 33,000 beet plants per acre in many areas) and better management of nitrogen, to maximize sucrose content of beets at harvest; and changes in grower-processor contracts which provide incentives for high quality beets (i.e. higher sugar content beets delivered to the factory).

For the 1989/90 crop, area harvested for beets is forecast at 1.3 million acres, the highest level in the 1980's. This is still well below the 1975/76 peak of 1.52 million, but it does represent about a 16-percent expansion since 1980/81-1983/84. The expansion in beet acreage has not been uniform regionally. Comparing this year's harvest acreage with an 1980/81-1983/84 average, the Red River Valley, Great Lakes, and Northwest regions are both up nearly 30 percent, but the Great Plains region is relatively unchanged and California acreage has actually contracted 6 percent. California's contraction is due to a combination of factors including its being a relatively high-cost producing area, chronic sugarbeet disease problems which have influenced some farmers to shift away from beets, and the profitability of alternative crops.

A record acreage of sugarcane is also being harvested in 1989/90, for the fourth consecutive year. Area harvested for sugar and seed is forecast at 866,700 acres, 2.5 percent above 1988/89, and 14 percent above the 1980/81-1983/84 average. As with beets, the expansion has not been uniform. Since the early 1980's, cane area has expanded 23 percent in Louisiana and 18 percent in Florida, but remained stable in Texas and declined 18 percent in Hawaii. High costs for land, marketing, and labor, as well as competition from other land uses have put unusual pressure on the Hawaiian sugarcane industry.

Another aspect of production that has undergone change is the structure of production and processing costs. The USDA through surveys conducted with the cooperation of the industry, has estimated the cost of producing sugar. Preliminary data for the 1988/89 crop are now available. Generally, it appears that the nominal cost of producing both beet and cane sugar has been falling since 1981/82, the earliest year for which comparable data are available.

These costs of production figures are national averages, and it is important to recall that there can be significant differences in regional costs. These costs include all economic costs, including returns to land.

Processor costs are derived from actual company records, as are cane grower costs for Florida and Hawaii. Costs for beet growers and cane growers in Louisiana and Texas are estimated from surveys utilizing the Firm Enterprise Data System's (FEDS) budget generator. The 1988/89 beet grower survey was sufficiently different from prior surveys that comparisons of 1988/89 with prior years must be done with care. The measured cost of refined beet sugar fell from 23.7 cents a pound in 1981/82 to 18.2 cents a pound in 1987/88 and then rose to a preliminary 22.8 cents a pound in 1988/89. The dramatic 1988/89 increase is due to both the more accurate 1988 beet grower survey and actual cost increases associated with the drought. The beet sugar cost of production trend from 1981/82 to 1988/89 is downward, but perhaps from a base a few cents higher than previously estimated. Contributing to lower beet sugar costs are increased volumes, which lower unit costs at the factory, higher recovery rates due to higher quality beets, and increased efficiency.

Raw cane sugar also shows declining costs, from 21.9 cents a pound in 1981/82 to a preliminary 19.3 cents a pound in 1988/89. The procedures used for 1988/89 costs are similar to prior years.

In 1987/88, the measured cost of production of refined beet sugar was less than for raw cane sugar by about half-a-cent. Even if beet costs prior to 1988/89 are understated by a few cents, it would still appear that refined beet sugar has a competitive advantage over refined cane sugar.

Sugar Consumption

U.S. sugar consumption, as measured by deliveries to domestic users, declined for 9 consecutive years from 1978/79 to 1986/87, as lower-priced corn sweeteners replaced sugar in a number of uses, particularly soft drinks. Since 1986, sugar deliveries have increased over 400,000 tons, raw value. For industrial food use, sugar appears to be holding its own reflecting its bulking and other properties important to confectionery and baking product manufactures.

USDA's recent issue of Sugar Market Statistics has enabled us to finalize our sugar deliveries estimate for fiscal year 1988/89 at 8.23 million tons, comprised of 4.86 of cane sugar and 3.37 of beet sugar. The Department's forecast for 1988/90 is 8.33 million tons of sugar in 1989/90, 1.2 percent above the estimate for 1988/89. This implies relatively stable per capita deliveries of 60.95 pounds (refined) annually, down almost 25 percent from 1980/81 (Note: This estimate does not include consumption of sugar imported in blends and mixtures).

U.S. Sugar Imports

U.S. sugar imports for domestic use fell from nearly 5 million tons in 1980/81 to less than 1 million tons in 1987/88. With the slight recovery in deliveries and the short 1988/89 beet crop, the import quota has grown somewhat this year, for the calendar 1989 quota was initially set at 1.24 million short tons. On September 12, the U.S. sugar import quota period was extended by 9 months from the initial January 1-December 31, 1989, period to January 1, 1989-September 30, 1989, concurrent with an increase in the quota to 2.19 million short tons. To ease the prospect of a tight supply in fourth-quarter 1989, shipping patterns were adjusted to allow 150,000 short tons of the quota increase to enter during October-December 1989. Then the quota was increased an additional 300,835 tons, effective November 27, reflecting the lower production estimate and new data that stocks at the end of fiscal 1988/89 were 1.22 million tons, 60,000 tons below the previous estimate. Both lower supply factors, combined with the slow pace of quota imports to date during the October-December quarter put upward pressure on U.S. prices.

U.S. CORN SWEETENER AND LOW-CALORIE OUTLOOK

U.S. per capita consumption of corn sweeteners surpassed sugar in 1985, as lower-priced HFCS replaced sugar primarily in the soft drink industry. Per capita sugar use has about leveled off since that time, while corn sweetener consumption has crept up further, based mainly on the increasing popularity of soft drinks. Per capita consumption of corn sweeteners (HFCS as well as glucose and dextrose) is currently forecast to decline slightly to around 69 pounds, dry basis, in 1989 off from 1988's record 69.6 pounds.

U.S. consumption of HFCS has nearly tripled during the decade from 2.1 million tons in 1980 to a forecast of 5.9 million in 1989. The rate of growth averaged a phenomenal 10 percent per year from 1980 to 1985 but has slowed since, to under 5 percent the last 3 years. Earlier in 1989, USDA forecast a 3 percent increase in U.S. HFCS output. But with HFCS deliveries falling 8 percent during the third quarter, it now looks like calendar 1989 HFCS output at best will increase only 1 percent. The relatively cool summer on the East coast and in the midwest was a factor, and perhaps also the higher soft drink prices to U.S. consumers.

Over the decade HFCS has consistently been priced enough below refined sugar prices to encourage industrial users to switch over from sugar if technically possible. For example, annual refined beet sugar prices during 1982-1988 averaged 25.0 cents a pound, 26 percent above the average price of HFCS-55 of 19.9 cents. The U.S. corn refining industry benefits from abundant U.S. corn supplies. U.S. annual average corn prices have not exceeded 1981's \$3.16 per

bushel this decade, and in two recent years (1986-87) actually averaged below \$2.00.

Net corn starch costs to wet millers for HFCS production have fluctuated more widely than corn prices because of their dependence on the varying prices for wet milling byproducts--corn oil, gluten feed, and gluten meal. Still, the average annual price peaks for net corn starch, in this decade, 5.53 cents per pound, occurred in 1981 and 1984, following drought-reduced U.S. corn crops. Net starch costs dropped to an average of 0.99 cents a pound in 1987, but have risen the last two years. Following last year's drought-reduced corn harvest, the monthly average for the first 10 months of 1989 averaged 3.49 cents per pound. Corn prices will decline later this year, with a harvest expected to be much larger than last year's. According to USDA's November crop estimates, production of corn for grain is forecast at 7.59 billion bushels, 54 percent above the drought-reduced crop of 1988.

USDA has no formal data collection system for low-calorie sweeteners. It is USDA's working estimate, however, that U.S. per capita use of low-calorie sweeteners has about tripled during the 1980's, to a level approaching 20 pounds per year (sugar-sweetness-equivalent). The low-calorie sweetener share of the U.S. sweetener market has grown from about 5 percent at the beginning of the decade to 12-14 percent currently.

The U.S. low-calorie industry has been dominated since the mid-1980's by aspartame, whose market share is around 70 percent. Aspartame was cleared by the Food and Drug Administration (FDA) for use in carbonated beverages in 1983, after about a 10-year approval process. Earlier this year FDA cleared aspartame for use in a number of other food products including frozen dairy and non dairy frostings, frozen fruit and fruit toppings, and in fruit spreads, and fruit syrups. The other low-calorie sweeteners currently approved by FDA for use in a variety of products in the United States are saccharin and acesulfame-K.

PROSPECTS FOR THE 1990'S--NEW DIRECTIONS, INNOVATIONS AND NEW TECHNOLOGIES

While policy will no doubt play a significant role in shaping world and U.S. sweetener markets in the 1990's, emerging new technologies would appear to be equally important to the direction sweeteners are likely to take in the United States and abroad.

Demand For Non-Sugar Sweeteners And Sugar

- o During the 1980's market analysts have seen the growth of corn sweetener substitutes for sucrose such as HFCS-55 mainly, in soft drinks. In the 1990's crystalline fructose markets could expand as a replacement for granulated sugar if it becomes more price-competitive with sugar and if sweetener technologists can solve its hygroscopic characteristic (absorbs moisture from the air) which cuts down on its functionality in many dry sugar uses. HFCS-55 can be expected to continue to grow in line with the growth for nutritive soft-drinks and continue to be the dominant corn sweetener, but HFCS-42 will increase its share as it continues to find new product applications in the food manufacturing industry.
- o Outside the U.S. and Japan, which together account for about 85 percent of current HFCS global consumption, HFCS is also expected to grow during the 1990's, and it will be particularly interesting to watch the developments in the USSR and China. According to corn-sweetener specialists, a plant using Finnish technology is planned to come on stream in the USSR in 1991 with a capacity of 70,000 metric tons, while Archer Daniels Midland is negotiating to construct a plant with capacity of some 100,000 tons of HFCS-42. The considerable corn shortage in the Soviet Union makes it difficult to envisage a significant expansion of the industry in that country unless domestic corn production can be significantly expanded and/or imports assured. China is in the midst of building ten corn wet milling plants in the 8,000 to 20,000 bushel-a-day range. When completed, some time in the next five years, plants will have a HFCS production potential of 300,000 to 400,000 metric tons. Currently about 50,000 tons a year is being produced in three plants. China has the greatest growth potential of any country according to many market analysts. China is a major sugar importer--so Chinese policymakers have an incentive to diversify the country's sweetener base--produces significant amounts of corn, as well as other starch feedstocks (i.e. rice and potatoes), and has a rapidly growing demand for soft drinks.
- o A key development in the future for low-calorie sweeteners will occur in December 1992 when Nutrasweet Company's patent on aspartame production in the United States runs out. The price for aspartame will likely drop and competition will intensify as it has in Europe recently. Actual cost data are unavailable, but some industry analysts have suggested that the price of aspartame could drop from current levels around 30 cents a pound (sugar-sweetener-equivalent) to production costs--perhaps as low as 10 cents. At such a low price, aspartame could compete with caloric sweeteners on a cost, rather than just caloric, basis. It is in the soft drink market that aspartame has enjoyed its greatest growth, so the

HFCS share of the beverage market could be the most vulnerable to lower aspartame prices. Moreover, soft-drink manufacturers would find it more profitable to produce and market diet soft drinks using aspartame. Some market analysts believe that diet soft drinks could capture one-half of the soft-drink market by 1995, compared with 29 percent forecasted for 1990 and only 11 percent in 1980.

- o Also of considerable importance for aspartame will be the U.S. Food and Drug Administration (FDA) ruling on the petition for approval of encapsulated aspartame. Encapsulation enhances its stability when subject to heat--a major problem for aspartame use, in baked goods.
- o There are also several new sweeteners awaiting approval from FDA that are already in use in other parts of the world such as Pfizer's alitame (2000 times as sweet as sugar) which is stable in heat and at low ph, and Tate & Lyle's sucralose (600 times as sweet as sugar) which is also stable under heat. Interestingly, one of the trends that may emerge from the availability of an increasing number of the sweeteners is their use as blends. For example, in France a major sugar refining company has recently begun to market a sweetener containing 99 percent sugar by volume, 0.6 percent aspartame, and 0.4 percent acesulfame-K--which reportedly has only one-half the calories of sugar (sugar-sweetener equivalent). Growth in these types of "blends" could be an important trend as we move through the 1990's. Researchers have found that blending sweeteners, such as aspartame and acesulfame-K, can produce a synergistic effect such that the blend can be sweeter and have an improved taste profile. Moreover, the FDA encourages a "multiple-sweetener or blend" approach to food manufacturing because it reduces health risks from any one sweetener.
- o Most of the activity in low-calorie markets is likely to remain in the industrialized world due to costs and technical problems of manufacture. With world population expected to climb to 5.3 billion in 1990, 5.8 billion in 1995, and 6.2 billion in the year 2000, the World Bank expects sugar consumption to grow 1.7 percent per year from 110.5 million tons in 1990 to 130 million tons in 2000. Much of this growth in population and sugar use is expected to occur in the developing world where market penetration by non-sucrose alternatives is likely to be small.

Production--Innovations, New Technologies

- o Turning to prospects for production in the 1990's, the question arises--what will be the trends of the 1990's? Which

of the trends of the 1980's will continue? USDA data indicates that, beet sugar yields and recovery rates have done very well, particularly in the United States and the EC. This reflects introduction of improved, higher-yielding seed varieties, changing cultural practices such as the better management of nitrogen inputs, an increase in the use of sucrose quality incentives in producer-processor contracts, and investments in new technologies and fine-tuning old ones to heighten the extraction rate of sucrose at the factory.

- One major innovation about to burst onto the U.S. market is the "chromatographic separator technology" developed by Amalgamated Sugar Company. This process, which Amalgamated is now marketing, extracts sucrose from molasses and has the capability to recover up to 80 percent of the sugar currently lost to molasses, lifting a typical factory extraction ratio from 82 percent to 92 percent.
- Also to increase efficiency, Spreckels Sugar Company has recently successfully processed imported raw cane sugar at their coastal beet facilities. Mixing cane and beet sugar for processing has special advantages in California where the sucrose quality of the fall harvested crop is traditionally lower than the spring crop, and the co-processing of beets with raw cane sugar helps "balance out the factory." According to industry sources, as urbanization and alternative crops continue to reduce beet acreage near coastal beet plants, the co-processing of imported or domestic raw cane sugar could become a regular occurrence, especially during periods when refined sugar prices are high.
- Cane sugar refineries have also been active in innovations and modernization programs. For example, the C&H refinery located at Crockett, California has just operationalized a \$25 million "Automatic Storage/Retrieval System (AS/RS) used to control inventory, stock location, and provide better service. While the up front costs are significant, improvements in customer service and product quality and cost savings are also expected to be significant. Also to reduce costs, almost two-thirds of Hawaii's raw sugar production going to the C&H facility is now "very-low-color" (VLC) sugar. This investment in quality improvement at Hawaiian mills reduces refining costs at Crockett by an estimated \$4.5 million annually.
- Looking at beet sugar yields internationally, it is interesting to note that both France (averaging 9.3 tons of sugar per hectare annually over the last 5 years), and the United States (averaging 6.4 tons) are well above the world average (4.4 tons), although U.S. beet sugar yields are still only two-thirds that of France. What are the implications on U.S. sugar supplies in the 1990's, if the U.S. beet sugar productivity moves more toward the level of France? Moreover,

the Soviet Union yields (averaging only 2.6 tons) remain well below the world average, but they are currently investing in "intensive technology" and their beet processing facilities. What are the implications on the world import market in the 1990's for sugar if the Soviets can lift their yields closer to the world average and thereby significantly reduce their import needs? For that matter what is the implication on beet sugar production if there is a fairly rapid diffusion of Amalgamated's "chromatographic separator technology"--they already have a pilot plant in Japan.

- o Cane sugar yields in contrast to beets have been relatively stable during the 1980's. Several specialists have mentioned to me that the global sugarcane industry has been working on a high plateau after sharp advances in yields in the 1950's and 1960's. But things could change in the 1990's. Recently I saw a wire service story reporting that a scientist in Brazil had isolated a bacterium that could triple the output of sugarcane by absorbing nitrogen from the air. In Hawaii, researchers at the Hawaiian Sugarcane Planters Association (HSPA) Experiment Station are doing ground-breaking work in molecular approaches to improvement of sugarcane. This biotechnology aims at mapping the genes of the sugarcane plant which would increase the possibility of genetically controlling desirable cane characteristics. Research is also underway in Hawaii and other areas of the United States in developing "tissue-culture-derived seedcane." These technologies are transferable and could have a major impact in lifting production and shifting the acreage now devoted to seedcane production to cane for sugar.

Where countries are in terms of yield provide one point of comparison of what is possible. Australia, for example, is the world leader (averaging 11.3 tons of sugar per hectare over the last 5 years) along with Hawaii (13.2 tons per hectare--after converting its 24 month crop yields to a 12 month basis) and the mainland U.S. is second (7.5 tons). India's yields (3.0 tons), the world's largest sugarcane producer, are only one-quarter of Australia's and Hawaii. Yields are also relatively low in Cuba, China, and Northeast Brazil for a myriad of reasons including lack of sufficient investment in R&D, the use in multiple ratoon crops, inefficient cultural practices, and poor field-to-factory transportation and processing systems. Again, what are the implications on world trade if India could double its productivity and become a regular exporter, or if China could significantly reduce its import needs through greater self-sufficiency?

- o The World Bank projects that global sugar output will increase an average of about 2 percent per year until the year 2000, thereby lifting production from a forecast of 109 million tons

in 1990 to 133 million in 2000. It foresees the bulk of growth coming from developing countries both in terms of expanded land devoted to cane and improved yields. These forecasts, however, could be overtaken by a break-through in technology or rapid diffusion of existing technologies. They also imply the need for countries to again assess the need to invest in new milling capacity as well as refurbish existing plants.

- Another trend that is increasingly evident in the late 1980's in the United States and is likely to be reinforced in the 1990's, is the strategy of many sweetener producing organizations to become stronger economically through development of new added uses for raw beet and cane materials. For example, Southern Minnesota Beet Cooperative is currently putting in equipment to make bakers yeast at their facility. In Hawaii, HSPA has research underway in sucrochemistry for non-food uses such as plastics and recyclable materials. HSPA is also testing different technologies for "steam explosion" of cane leaves and bagasse in order to extract cellulose, lignin and xylan fractions used as feedstocks for furfural, polyurethanes, and paper pulp. If these processes prove to be technically and economically feasible, the Hawaiian industry may be able to achieve greater economic stability than it has now through increasing the value of its fiber crops as well as to eliminate one its nuisance activities and costs--burning cane fields to clear off sugarcane leaves before harvest.
- It should be added that development of down-stream businesses at corn-wet milling facilities is nothing new as illustrated by their current impressive list of by-products. To this list of products (HFCS, corn syrup, citric acid, etc.) may be added biodegradable plastics in the 1990's. According to corn wet millers, development of biochemical businesses offer the potential for improved margins associated with value added extensions and provides capacity utilization stability for basic processing operations.
- Another important trend that appears to be emerging as we head into the 1990's, particularly in the United States, is increasing concern over the availability of labor to harvest sugar crops in the upper midwest, Florida and Hawaii and increasing concern about the environment. The environment is already an acute concern in Florida and the sugarcane industry there is increasingly being asked to reassess their use of chemicals that might be causing groundwater pollution and wet land degradation in South Florida. In Hawaii, there are already established systems for monitoring of chemicals that could potentially leach into ground water. In addition to the costs of monitoring these impacts, these industries, and others elsewhere may face added costs through banning by EPA

of chemicals now commonly used in sugar agriculture. For example, dalapon was not re-registered by EPA last year and atrazine, a leading pre-emergence herbicide commonly used by cane growers is now under review. Interestingly many other sugar producing countries, especially in the developing world, are not required to maintain the quality of the environments they work in--perhaps this will change, but in the meantime it raises U.S. costs in comparison with many other countries.

The U.S. and Self-Sufficiency

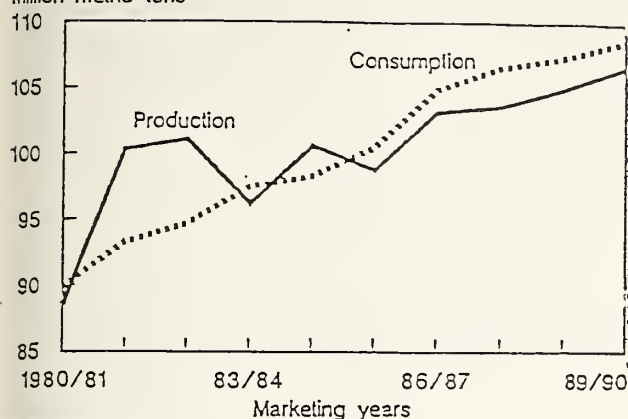
Lastly, I would like to touch on a subject that recently came up in a meeting with an Australian official. This official mentioned to us that as a sugar exporting country, one of their fears has been that if the U.S. maintained its existing sugar price support program, the U.S. could in the 1990's become self-sufficient in sugar and eventually use subsidies to export sugar. In fact, this concern apparently was a major influence in Australia's decision to prepare its GATT panel case against the U.S. sugar quota program.

While I cannot give you specifics on our long-term projections into the 1990's, current assumptions on U.S. sugar production and consumption growth into the 1990's indicate that the United States will remain a substantial net sugar importer with continuation of current program loan rates.

Thank you

World Sugar Production and Consumption

Million metric tons



1989/90 Forecast.

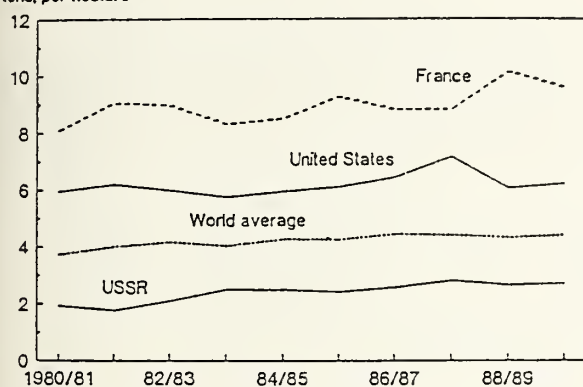
Table 1--Sugar production in the European Community and selected major producing countries

Country or area	1987/88	1988/89	1989/90
Million metric tons, raw value			
	Forecast		
Australia	3.53	3.68	3.80
Brazil	8.46	8.58	7.50
China	4.71	5.10	5.30
Cuba	7.40	8.10	8.00
European Community	14.16	14.78	14.71
India	10.00	10.15	10.42
Mexico	3.81	3.68	3.50
Thailand	2.70	4.02	4.00
United States	6.48	6.09	6.42
USSR	9.56	8.90	9.00
Total	70.81	73.08	72.65
Share of global production			
	Percent		
	68.5	69.3	68.73

Source: USDA

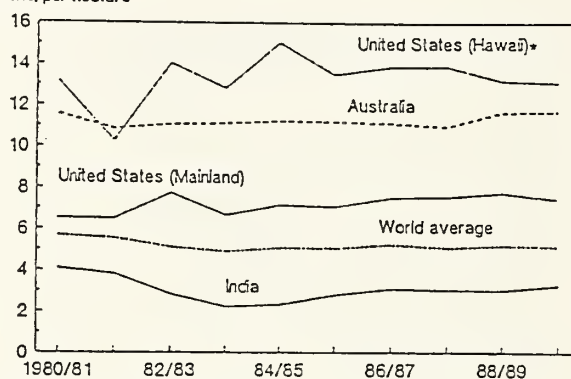
World Beet Sugar Yields Compared with Selected Countries

Metric tons, per hectare



World Cane Sugar Yields Compared with Selected Countries

Metric tons, per hectare



*Yield of Hawaii's normal 24 months crop converted to 12 months basis for comparison purposes.

Table 2--Sugar consumption in major regions of the world

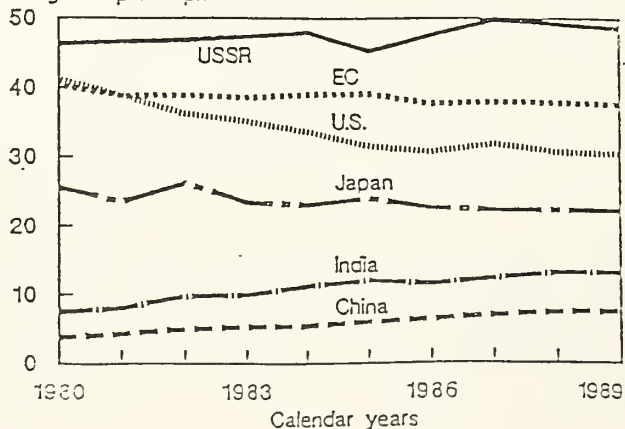
Region	1987/88	1988/89	1989/90
Million metric tons, raw value			
	Forecast		
North America	12.23	12.34	12.45
Caribbean	1.44	1.45	1.47
Central America	1.03	1.06	1.06
South America	11.49	11.35	11.58
European Community	12.29	12.23	12.14
Other West. Europe	1.44	1.41	1.40
Eastern Europe	20.05	19.89	19.76
Africa	8.82	8.87	9.03
Middle East	5.45	5.70	5.85
Asia	30.87	31.73	32.29
Oceania	1.06	1.06	1.12
Total 1/	106.15	107.10	108.14

1/ Totals may not add due to rounding.

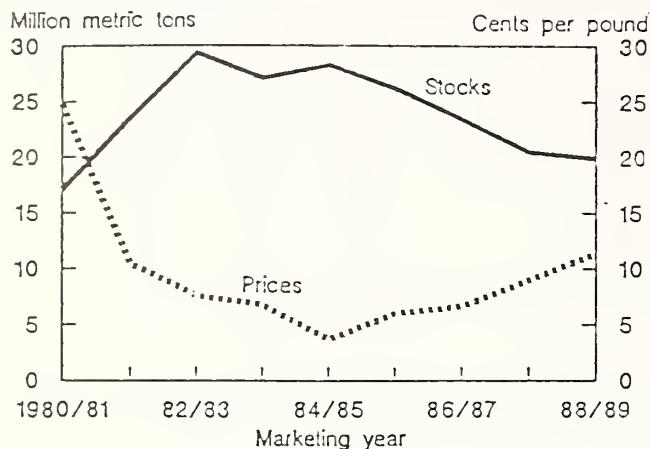
Source: USDA

Per Capita Sugar Consumption by Selected Countries

Kilograms per capita

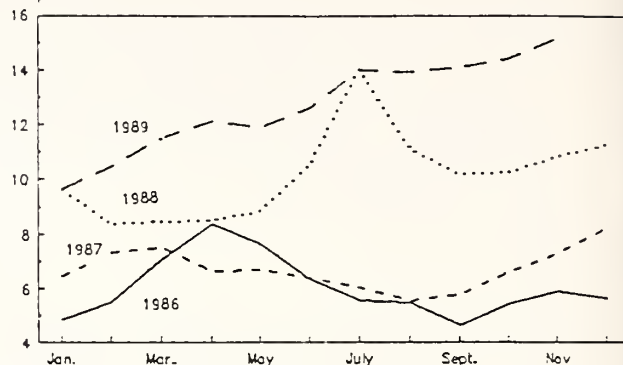


World Sugar Ending Stocks and World Sugar Prices



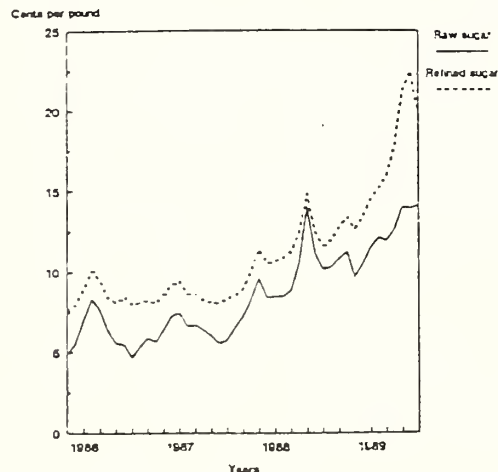
World Price for Raw Sugar

Cents a pound



No. 11 f.o.b. Caribbean

World Refined Sugar Prices Compared With Raw Sugar Prices



—Raw price No. 11 f.o.b. Caribbean refined price, London daily price f.o.b. Europe

Table 3--Sugar exports for the world and leading sugar exporters

Year	World Total	Australia	Brazil	Cuba	EC 1/	Thailand 2/	Five leading exporters share of world exports
	Million metric tons						Percent
1974/75	22.62	2.14	2.42	5.76	1.88	0.49	57.3
1979/80	27.35	2.32	2.33	6.70	5.02	0.57	60.8
1984/85	30.08	2.58	3.44	7.51	5.17	1.83	68.4
1988/89	28.63	2.96	1.37	7.30	2.69	2.95	70.5
1989/90 3/	28.29	2.93	1.30	7.20	5.54	3.00	71.3

1/ Includes intra-EC trade.

2/ The Philippines was a major exporter through the early 1980's.

3/ Forecast.

Sources: USDA

Table 4--Sugar imports for the world and leading sugar importers

Year	World total	Major importers					Five leading importers' share of world imports
		USSR	U.S. 1/	Japan	China	EC 2/	
	Million metric tons						Percent
1974/75	22.85	3.24	4.38	2.72	0.41	4.58	67.1
1979/80	29.23	4.99	4.32	2.59	1.17	2.93	54.7
1984/85	28.33	4.52	2.57	1.93	1.89	3.00	49.1
1988/89	29.01	5.33	1.78	1.85	2.50	2.69	48.8
1989/90 2/	29.72	5.18	1.79	1.89	3.00	2.63	48.8

1/ Based on foreign Offshore Receipts.

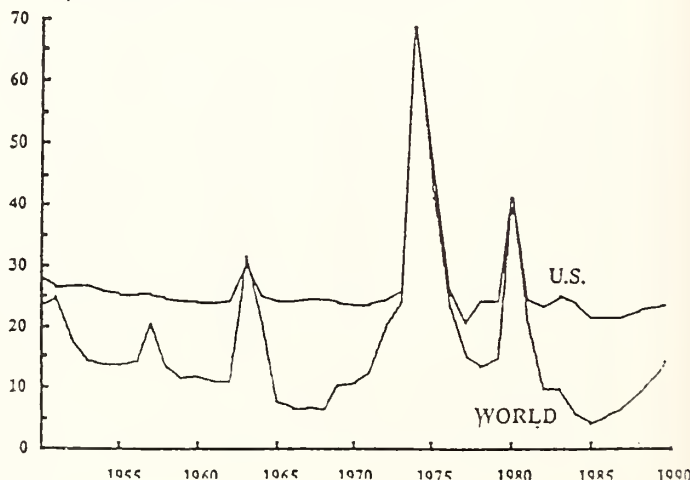
2/ Includes intra-EC trade.

3/ Forecast.

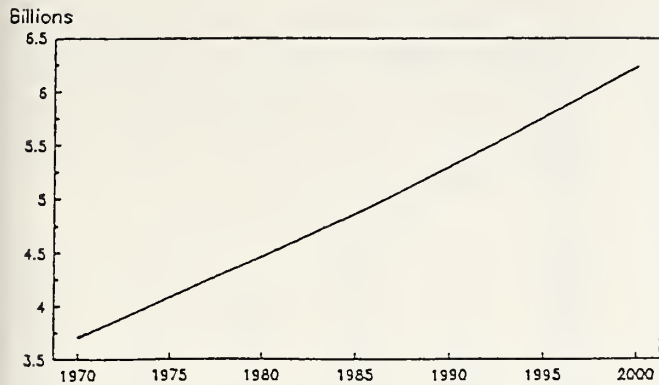
Sources: USDA

U.S. AND WORLD RAW SUGAR PRICES

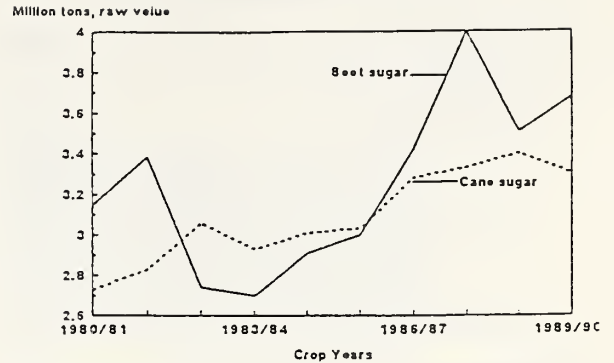
Cents per Pound



World Population Growth

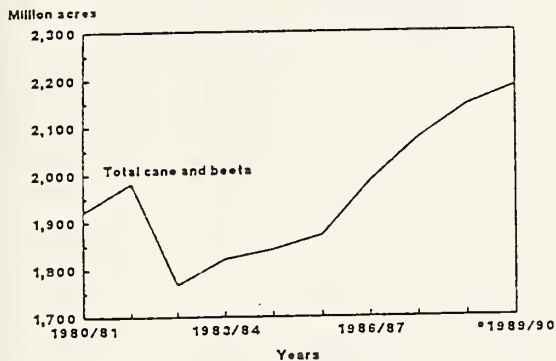


U.S. Sugar Production



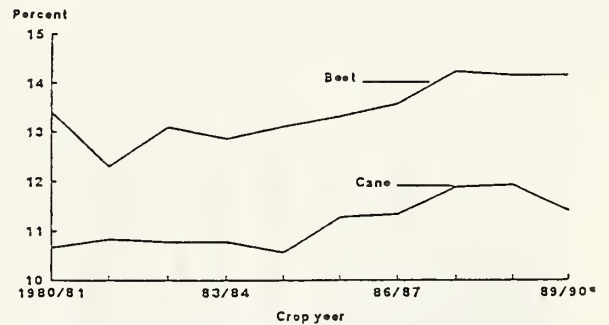
*Forecast for 1989/90

U.S. Sugar Crops, Acreage Harvested



*Estimated for 1989/90

U.S. Cane and Beet Sugar Recovery Rates*



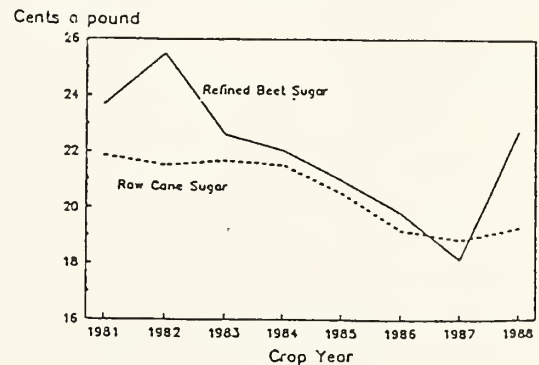
*Raw sugar per ton of beets or cane. Estimated for 1989/90

Table 5--U.S. sugar, supply and use parameters, fiscal years

Description	1987/88	1988/89	1989/90
1,000 short tons, raw value			
			Forecast
Total production:	7,146	6,712	7,075
Beet sugar	3,822	3,396	3,725
Cane sugar	3,324	3,316	3,350
Florida	1,520	1,563	1,510
Louisiana	731	797	850
Texas	104	110	90
Hawaii	969	846	900
Deliveries	8,193	8,226	8,325
Quota imports	874	1,376	1,491
Oct-Dec	226	351	250
Jan-Sept	648	1,025	1,241
Ending Stocks	1,316	1,224	1,495
Stocks to use ratio*	15.3	13.9	17.0

*/ Based on total use

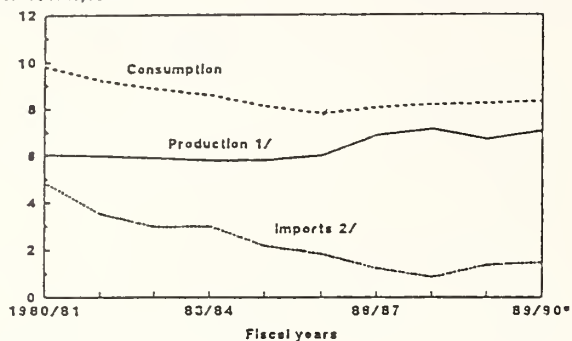
U.S. Cost of Producing and Processing Refined Beet Sugar and Raw Cane Sugar, 1981-1988 Crops



Source: Economic Research Service, USDA

U.S. Sugar Production, Imports, and Consumption

Million short tons, raw value



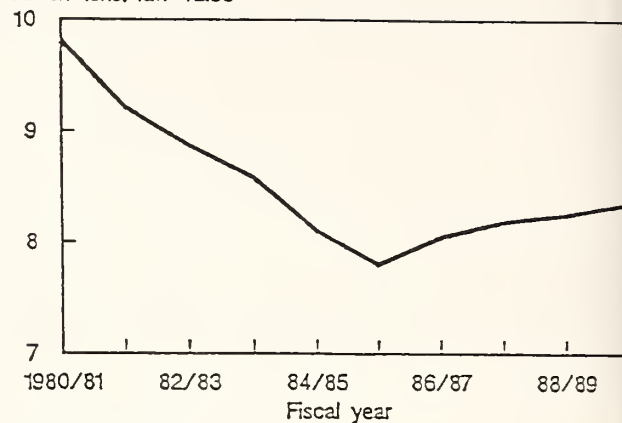
1/ Total deliveries

2/ For domestic use; excludes imports for re-exports

*Estimate

U.S. Sugar Deliveries

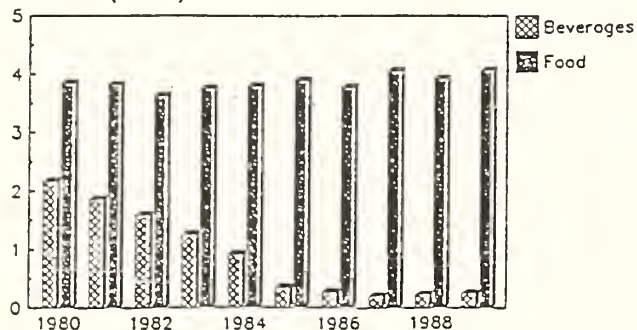
Million tons, raw value



Estimated for 1989/90.

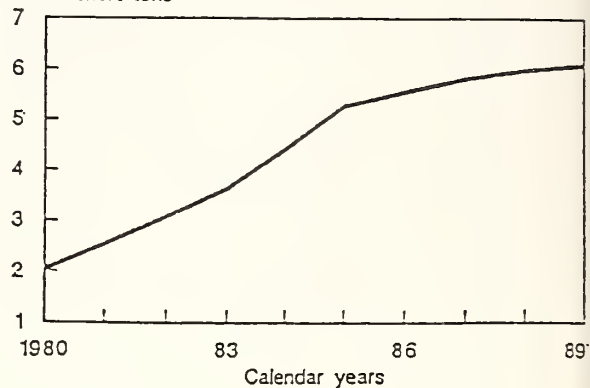
U.S. Sugar Deliveries for Industrial Use

Million short tons (refined)



U.S. Consumption of High-Fructose Corn Syrup

Million short tons



Dry weight basis.

Table 8--U.S. high fructose corn syrup(HFCS) supply

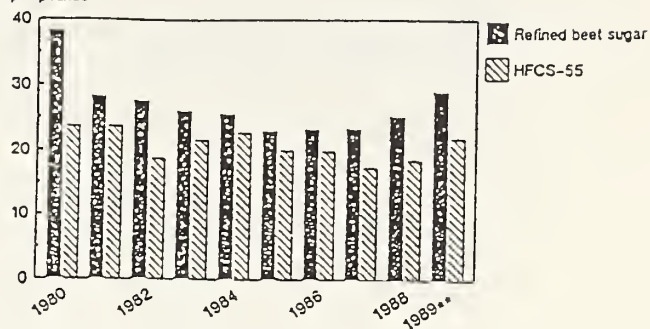
Supply					
Calendar year	Domestic shipments			Imports	Total supply
	HFCS-42	HFCS-55	Total		
1,000 short tons, dry weight					
1980	1,530	650	2,180	---	2,180
1981	1,603	1,069	2,672	---	2,672
1982	1,554	1,554	3,108	---	3,108
1983	1,622	1,982	3,604	28	3,632
1984	1,610	2,684	4,294	124	4,418
1985	1,325	3,388	5,213	185	5,398
1986	1,872	3,485	5,357	224	5,581
1987	2,027	3,595	5,622	203	5,825
1988	2,342	3,531	5,873	184	6,057
1989 1/	2,424	3,487	5,911	178	6,089

1/ Forecast

Source: USOA

Wholesale Prices for Sugar and HFCS, * Midwest

Cents per pounds

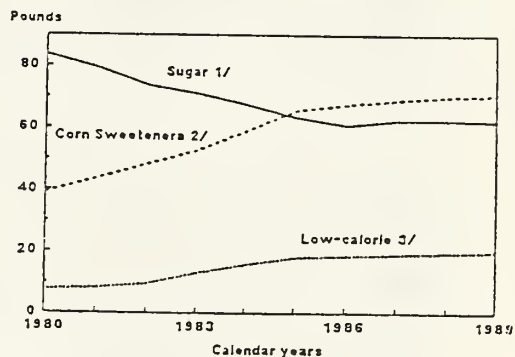


* dry basis ** Average January-September

LOW-CALORIE SWEETENERS

Product	Sweeteners Index (sugar=1)	Food & Drug Administration (FDA) Status
Acesulfame-K	200	Approved
Alitame	2,000	Under Review by FDA
Aspartame	180	Approved
Cyclamate	30	Banned in 1970, Currently review by FDA
Saccharin	300	Moratorium on proposed ban in 1977 expires in 1992
Sucralose	600	Under Review by FDA

U.S. Per Capita Sweetener Consumption

1/ Refined Sugar
2/ HFCS, glucose, and dextrose
3/ Aspartame and Saccharin

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.



Outlook '90, Session #20

For Release: Wednesday, November 29, 1989

WORLD SUGAR OUTLOOK: ANOTHER VIEW

Christopher Pack
Editor, Czarnikow Sugar Review

In the brief time available this afternoon it will only be possible to pencil in the outlines and highlight some of the key features of the current situation for sugar. The tightening statistical position will occupy centre stage for much of the year ahead but there are also one or two longer term developments which may come into slightly sharper focus over the next twelve months. I will mention these later, not just to give myself the usual analyst's room for manoeuvre, but because, as the events in East Germany over the past month have graphically demonstrated, long run developments sometimes have a habit of taking a quantum leap forward.

All the ingredients are in place to make 1990 one of the more interesting and, perhaps, historic years that the sugar market has seen for some time. The long low price cycle which dominated much of the 1980s was the direct result of the large surge in production expansion that took place in the two seasons following the last bull market in 1980. Successive stock reductions over the past four seasons have gradually eliminated that excess stock so that by the end of August this year carry-over levels as a percentage of consumption had returned to those of 1980/81. Production in 1989/90 will improve over last season but only by a modest amount to some 107 million tonnes and, with consumption next year showing a potential to reach 109.5 million tonnes, there is every prospect of a further stock drawdown in 1990.

At these low levels there will be increasing resistance to drawing further sugar out of stock. Competing demand, together with the resulting market price, will determine where the balance will be struck between the limitations on consumption, where these take place, and the drawdown in stock. Whether or not this results in an old style bull market, the way in which world prices, producers and consumers interact over this tightening supply situation will also affect relationships and response patterns throughout the next decade.

Before we leave this chart there are some interesting comparisons with earlier bull markets. The low price cycle in the late 1970s was much shorter, only some five years, and not nearly as damaging for producers as other periods of low price. (The lowest monthly average

in that period was 6.43c per lb in July 1978). This undoubtedly contributed to the readiness of producers to expand in the early 1980s after the last bull market. Despite the much higher peak of the 1974 bull market at 65.0c per lb, the subsequent production response was less immediate and more gradual. Producers retained harsh memories of the much lower prices of the late 1960s and early 1970s which had prevailed over a much longer span. The parallel with the latest low price cycle is very marked and the trauma of rationalisation suffered by many industries after the very low prices in 1985 may still inhibit unrestrained expansion now that prices are improving.

Before we get carried away with all these pointers to a possible new bull market for sugar, it must not be forgotten that the world market is essentially residual in nature and that many of the major participants can show wide reversals in their respective balances, often within the course of one crop. I will touch on a few of these by way of illustration.

From the start Brazil's fuel ethanol policy has been one of the major concerns for the market. The allocation of significant quantities of cane, currently some 70 per cent of the entire crop, to distilleries depends on the government's Proalcool programme being maintained. How firmly would this hold if sugar prices were firm and oil prices low? In the event the threat of cane supplies being switched from alcohol distilleries to the sugar sector has not materialised and, if anything, the reverse has happened as strategic stocks of fuel alcohol have been run down over the past two seasons to maintain performance in sugar. This season exports of sugar will decline to less than one million tonnes while there is also a deficit of fuel ethanol.

There are more than four million vehicles running on pure ethanol and the scope for switching fuels is limited to older cars burning gasohol blends. However, you will have seen recent reports that subject to Government approval, Brazil has purchased 1.5 billion litres of methanol, valued at some \$100 million, to make up the deficit in domestic ethanol production this season. To produce this quantity as ethanol would have required some 20 million tonnes of cane, or, say, two million tonnes of sugar, which in today's white sugar market would be worth \$800 million. This illustrates some of the pressures on the Proalcool programme and, if current low methanol prices continue, it would be tempting for Brazil to extend this approach, possibly into the 1990/91 season. The size of Brazil's cane crop has shown very limited growth for several seasons and, with growers finding other crops more attractive, it may require new government initiatives to encourage expansion. On the other hand the methanol option may be a short term method of bringing more cane to sugar mills for both the export market and the growing domestic sugar market. The pie chart shows how small shifts in cane for ethanol could have significant impact on export volumes for sugar.

India is another producer where important quantities of cane have an alternative outlet to sugar mills and last season there was a major reversal in the prospects for sugar production following a

relatively minor shift in the percentage of cane deliveries. In 1987/88 sugar mills utilised a historically high proportion of total cane - some 48 per cent. Expectations of a similar share formed the basis of initial estimates for 1988/89 with hopes that sugar production might reach 10.9 million tonnes, raw value. Producers of gur and khandsari competed more strongly for cane, however, and the sugar mills' share slipped to 44 per cent of a cane total that had slipped back slightly so that final production only reached 9.455 million tonnes. Such a large swing turned hopes for exports into a need for imports.

This season the cane crop is expected to rise by some six to seven per cent to 210 million tonnes but once more sugar performance will depend on the amount of cane diverted to gur and khandsari manufacturers who again are competing strongly for supplies. Our estimate of 10.3 million tonnes is higher than some industry forecasts at 9.57 million tonnes but further imports would seem to be needed later this season as consumption continues to forge ahead. Cane prices were raised as part of a pre-election agricultural package but further policy changes may well be needed if India is not to continue as a regular importer of sugar.

The Soviet crop is providing the basis for a wide range of estimates and the issue centres on whether the acknowledged good state of the crop in the ground has been put at risk by delays in transporting beet to the factories. Latest reports indicate that our most recent forecast of 9.25 million tonnes may have to be increased to between 9.5 and 10.0 million tonnes. Possible buying on the world market will relate not only to domestic production but also to deliveries from Cuba where earlier expectations of another high crop may have to be scaled back as rains have been below optimum. In the longer term the increasing application of Intensive Cropping Technology (ICT) in the USSR and the general drive towards improving agricultural efficiency through joint ventures can be expected to show results as we move through the 1990s. Whether such gains will be achieved sooner rather than later is still too early to tell.

Per capita consumption is already quite high at 46 kilos per annum but the authorities may decide to build up pipeline distribution in order to restore consumer confidence in the availability at retail level. Depending on the progress of reforms and economic activity, and as a result supplies of goods to consumers, there is likely to be a speed up in the switch to industrial usage as opposed to direct consumption of sugar.

China has played a key role in market behaviour over the past two years. Imports in 1988 approached nearly 4.0 million tonnes and drove up premiums in the Far East for raws over futures prices, even to the point of attracting western hemisphere sugars into the area. With some of that sugar surplus to immediate requirements, China has been able to keep a low profile for much of this year by destocking and restricting internal demand leading to the collapse of the Far East raws premium. I believe that China will have to return to the world market next year but the authorities will need to resolve the problems raised

by their low internal price structure, especially as world prices move higher.

Low consumer prices for 25 years and more have spurred internal demand which until last year was also fuelled by general economic development. During the first seven years of this decade the annual growth in sugar consumption averaged ten per cent. With more industrialised projects being set up in rural areas, resources and manpower were being diverted from traditional crops and farmers were finding new and growing demand for alternative cash crops as a result of increased spending power in large urban population centres. Improving yields masked this decline in area for a time but production slumped in 1987/88 leaving a substantial deficit last year.

Last year the government attempted to free up internal prices in various sectors but the rapid inflationary effects which followed brought the programme to a halt. For a time the authorities found they were subsidising both sides of the sugar equation with producer subsidies to encourage farmers to increase production and consumer subsidies to alleviate the impact of price rises. Both actions masked each sector from the price signals which would lead to a correction of the situation. There have been numerous predictions from Chinese sources that a deficit situation is expected to continue for some years to come and with per capita usage at only six kilos per year, the potential for demand growth is enormous and will be significant for the world market throughout the 1990s. At that level any improvement in offtake will be strongly linked to economic development. The nettle to be grasped by the authorities is how and when to resume the moves towards market economics in the sugar sector.

The EEC this season has shown the extent to which beet seed technology and farming practices are now able to overcome quite adverse conditions. After poor emergence for some later sown beet, a very dry summer and potential problems from virus yellows, it now seems that as campaigns move into their closing stages production will actually show an improvement over last season at 14.83 million tonnes from beet.

There are also indications that current world prices will encourage producers to reduce the amount of 'C' sugar carried forward from season to season. Declarations do not have to be made until the New Year when the final amounts will reflect the world price outlook at that time. Already estimates of 500,000 tonnes have circulated in white sugar terms with some even suggesting that as little as 300,000 tonnes may be declared. Since 1.1 million tonnes were carried in from last season to this, the difference will represent an additional availability to be marketed next year over and above any current crop surplus.

Some producers have already negotiated forward sales of 'C' sugar for several years and as they will be anxious to avoid weather related problems placing these in jeopardy, it is likely that areas sown to beet next spring will increase after the static or falling trend of recent years.

I should also make a quick reference to Mexico where privatised mills facing weather problems seem set to produce another poor crop, requiring imports of possibly 3/400,000 tonnes to fulfil consumption next year. After destocking too much in 1988, Mexico will import whites (750,000 tonnes) and exported raws (450,000 tonnes) this year and has been a major influence in the high premiums and tight supplies of white sugar.

And so to the likely responses this season. For supplies, the EEC can destock for one season while Brazil and India might even at this late stage revise policy to boost sugar. The Soviet crop is not so much a response to prices as a measure of the progress of reforms. However, it would seem that we must look forward to 1990/91 crops before a major recovery in production is possible. But by 1991 demand is likely to approach 111 million tonnes and production will need to advance by some four to five million tonnes just to achieve balance without rebuilding stock. A crude aggregate of the best crops over the past decade indicates that installed capacity world wide probably exceeds 120 million tonnes. There are several instances, however, (Brazil and Philippines) where the lack of available cane may frustrate a repeat of the previous best performance.

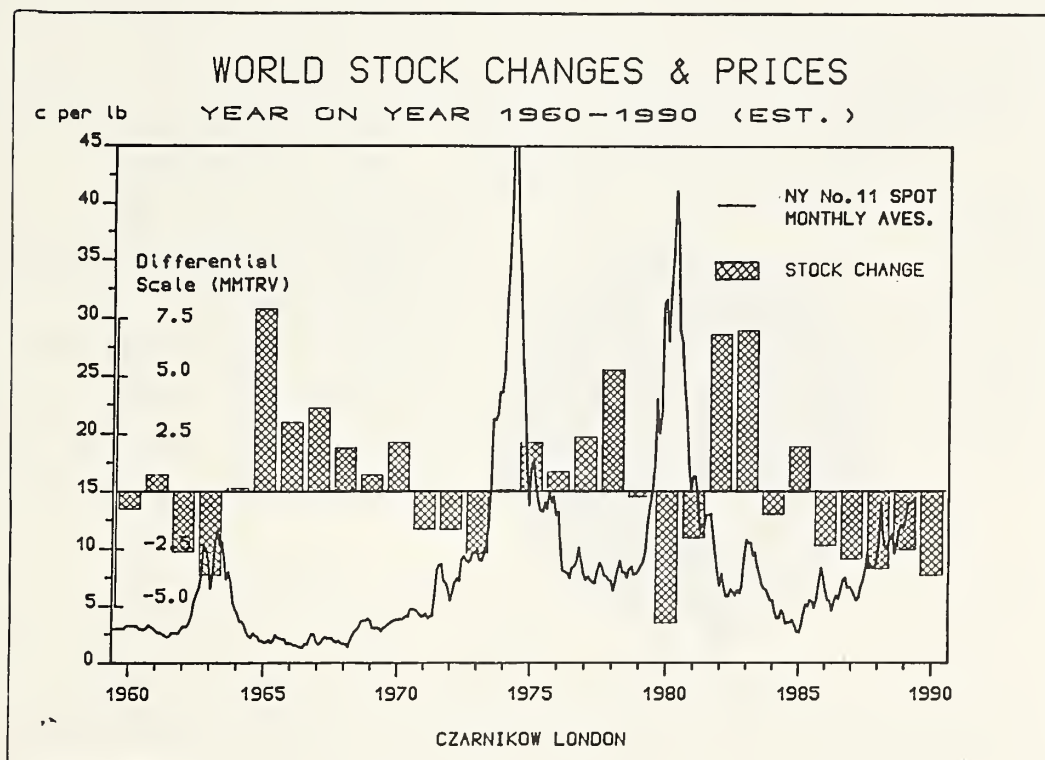
For demand the most vigorous growth rates throughout the 1980s have been recorded in Asia and higher world prices are likely to moderate these. Many of the economies in the region have also shown good growth and it should not be assumed that all will necessarily show high price elasticity. Next year will prove to be an interesting test bed for new demand/price relationships.

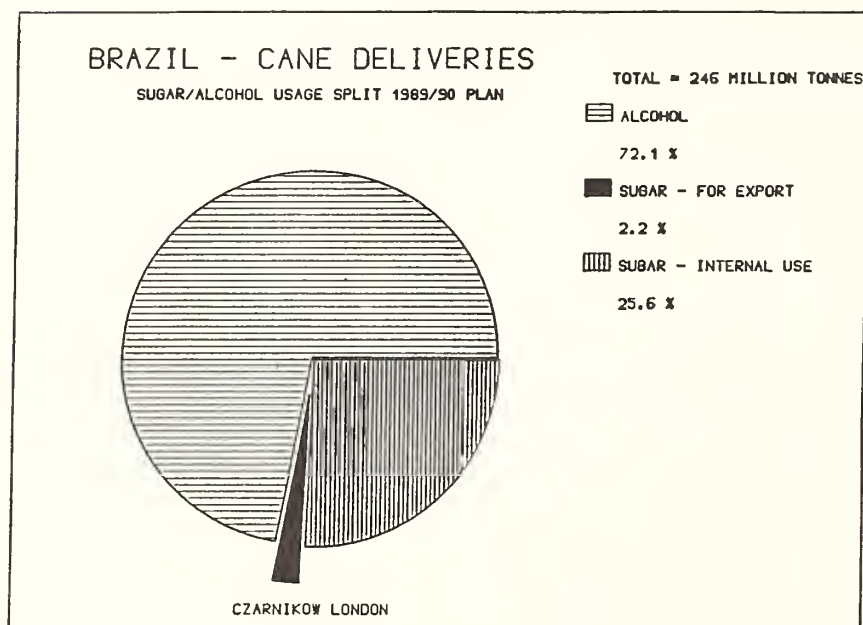
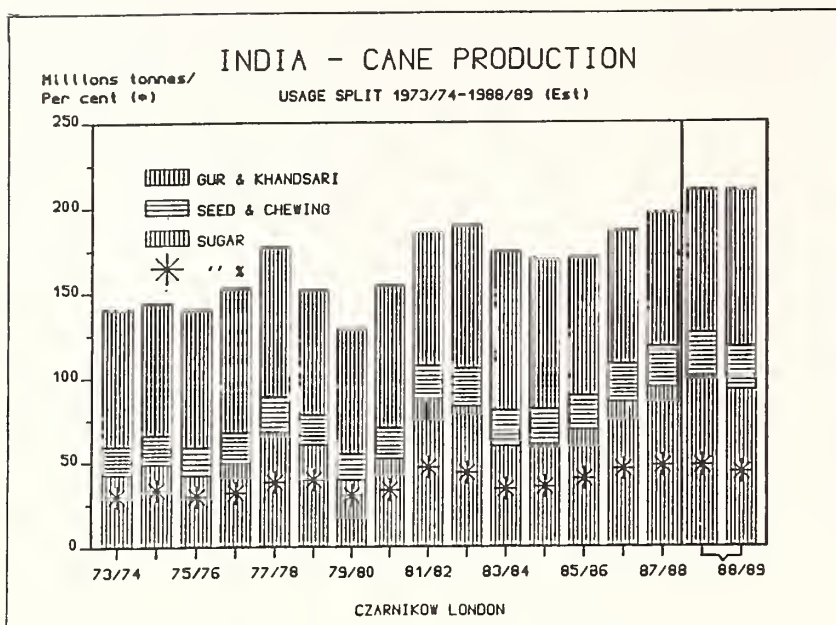
The cyclical and structural change approaches for assessing sugar price behaviour have often been presented as mutually exclusive and in conflict. In fact I believe the two can co-exist. The residual nature of world trade continues to mask price signals to major portions of the world's production and consumption and as a result delays are inevitable in responding to world surplus or shortage. A cyclical pattern is likely to remain, although the intervals and extent of price extremes may well be modified. The availability of more alternative sweeteners will not fill a sudden deficit but, like sugar, those producers will gear up new production after a high price stimulus. The greater portion of third world countries importing sugar may affect the extent of any new peaks although many of those economies have grown rapidly while buying decisions at times of shortage can still be driven strongly by political considerations. All in all 1990 promises to be a fascinating year for sugar with the focus for tight supplies likely to emerge for the third quarter of the year.

In closing I would like to come back to the economic and political reforms that are sweeping across many socialist countries in East Europe and throughout the world. These will bring important changes throughout the 1990s as more and more adopt market economics. It is too early to predict where these changes will lead, so fast have recent developments taken place, but as producers adapt to incentives and consumers leave their false security of fixed prices, both sides of

the supply/ demand equation will evolve new relationships over the next few years.

Another major initiative is the current Uruguay Round of Multi-national Trade Negotiations (MIN) which has targetted agricultural support and access to markets as areas for reform. There has been less north/south dialogue and more of conflict between the main industrialised countries of the USA, EEC and Japan defending their existing support policies for domestic producers. Despite this apparent lack of progress, the topic remains firmly on the agenda and, should a system for reforms ever be agreed, progress could be surprisingly rapid. This, together with the reforms demanded in centrally planned economies, could well represent a major potential for structural change in the sugar economy over the coming decade. Internal markets would add a significantly broader base to the areas which are responsive to world price signals and we would have to rewrite our models. Before last month such notions could be comfortably pigeonholed into a 'long term' only category but after recent events such possibilities must be brought forward and the 1990s promise to be a stimulating time for sugar.







Outlook '90, Session #20

For Release: November 29, 1989

THE CHANGING STRUCTURE OF THE U.S. SWEETENER INDUSTRY

William C. Shanley, III
President and Chief Executive Officer
Amstar Sugar Corporation

First of all, I want to thank the Department of Agriculture, the organizers of this conference and our moderator, Bob Barry, for the invitation to address you this afternoon. The Agricultural Outlook Conference is always an excellent forum for an exchange of views on the changing face of American agriculture and I am grateful for the opportunity to be included on the program.

The topic on which I have been asked to speak, "The Changing Structure of the U.S. Sweetener Industry," is indeed a timely one. I have made the sugar business, specifically the cane sugar refining business, my career for the past forty years. It has been in the last fifteen of those forty years, however, that I have seen far more astonishing changes in the structure of our industry than in the preceding two and a half decades.

My own company, Amstar Sugar Corporation, has been caught in the maelstrom of these changes, not once but several times. Amstar Sugar Corporation, known for many years as the American Sugar Refining Company, has been in business in the United States since far back in the nineteenth century. Our refinery in Brooklyn has been refining cane sugar on the same site since 1893. In the past decade, however, the company has undergone a series of changes that mirror, in many ways, what has been happening to the U.S.

sweetener industry and, by extension, to the whole of American industry and agriculture.

Let me review the major changes that Amstar has undergone in the recent past. Over the past ten years, Amstar has gone through the following changes in structure: the permanent closure of two of its five refineries (in Philadelphia and Boston), two leveraged buyouts, the sale of its corn sweetener and beet sugar operations, and most recently, in December 1988, the sale of the company to Tate and Lyle, the British-based sugar company that also owns, in the United States, A.E. Staley, a major corn sweetener producer and Western Sugar, a beet sugar processor. The fact that Amstar Sugar is now part of a business entity with operations in all segments of the U.S. sweetener industry gives me, I hope, a certain understanding of the dynamics of the whole sweetener market, rather than just the more provincial viewpoint of a cane sugar refiner. It is from that broader perspective that I will address my remarks.

Over the past ten years, American industry and agriculture across the board have undergone substantial changes. In agriculture, it has represented an accelerating shift from the family farm to agribusiness enterprises. In industry and agriculture, both, there has been a keen and, probably, long-overdue, emphasis on productivity. My own company, for example, produces roughly the same volume of sugar annually as it did a decade ago, but with approximately half the labor force. The introduction of such efficiencies has been representative of both the cane refining and beet processing industries.

The reason that I chose fifteen years ago as the point at which the sweetener industry began to undergo such massive changes is that 1974 was the year of two highly significant, and interrelated, events, namely, the great bull market in world sugar

prices which peaked at 63 cents per pound, and the expiration of the Sugar Act. The Sugar Act was a piece of legislation, dating from 1933, under which the Department of Agriculture regulated domestic sugar production, imports, distribution and price. In short, it was a comprehensive managed-supply system.

High world prices and the introduction of a free market for sugar in the United States gave birth to the high fructose corn syrup industry. From its development in the mid-1970's to the present, HFCS has taken over nearly half of the combined sugar/HFCS market, mainly by replacing sugar in the soft drink industry.

A look at the statistics makes very clear that the development of the HFCS market occurred at the expense of the U.S. cane sugar refining industry. Since 1974, beet sugar output over time has remained fairly stable at between three and four million tons per annum, given the yearly crop variations based on weather conditions. Cane refiners' volume, in contrast, has declined from about eight million tons in the early seventies to around four and a half million tons today. Besides this loss in absolute volume, growth in the sweetener market of about four million tons, which mainly reflects increased soft drink sales, was also preempted by the HFCS industry.

The result has been, over the past decade, a massive restructuring of the cane sugar refining industry. Ten refineries have been shut down permanently and sold for scrap, three longtime refining companies have gone out of business altogether and, in total, about 40% of cane sugar refining capacity has been permanently lost. Besides Amstar, now linked with both HFCS and beet sugar companies, two other refiners have bought beet sugar companies and another is a subsidiary of a corn wet-miller. Of the six remaining cane refining companies in the United States, only two still stand alone.

The producing side of the sugar industry, beet processors and domestic raw cane mills, has undergone significant rationalization and undertaken considerable process efficiencies in recent years. The number of individual beet processing factories has declined from 56 to 36, especially during the late 1970's when the existence of a relatively free market in the United States put pressure on the beet industry to shake out the least efficient operations. More recently, in the 1980's, the surviving beet processing plants have implemented an impressive array of process efficiencies that have boosted yields. According to USDA statistics, process efficiencies have increased sugar beet recovery rates by 6% over the past ten years, and further improvements in this area are expected. Despite consolidation in the beet processing industry, total beet sugar output has remained quite constant. In 1976, beet sugar production reached four million tons. In 1987, with twenty fewer factories in operation, the same level of output was again achieved.

The cane milling industry in Florida, Hawaii, Louisiana and Texas has experienced a similar shakeout. The number of cane mills has been reduced by about 40%, from about 70 to 40, since the mid-1970's, with most of the contraction occurring in Louisiana where a number of older small mills were shut down and their production consolidated into larger, more efficient, ones. Average crushing capacity per mill has risen impressively. Total domestic raw cane sugar output has increased by about 25-30% over the past decade.

While all segments of the domestic sugar industry have undergone substantial modernization and restructuring to produce greater efficiencies, it is important to underline the fact that, in the United States, only the cane sugar refining industry has experienced a net loss in capacity and sales volume, and a

significant one at that. It has borne the full brunt of the rise of the high fructose corn syrup industry.

Looking at the current condition of the U.S. sweetener industry, when all these changes are factored in, it is my assessment that the industry is now a healthy, stable and well-balanced one -- a condition that now applies to all segments, cane and beet growers and processors, cane sugar refiners and corn sweetener producers. The cane refining industry, having undergone its painful rationalization, is now operating at close to capacity. Cane sugar production has just about reached its peak, a subject about which I will have more to say later. The beet processing industry, despite the drought of 1988 and its after effects in the summer of 1989, is on firm footing with a healthy capacity/utilization level. (With respect to the beet sugar industry, my observations are shared by Jack Lackman, Vice President of American Crystal, who said in a recent speech that beet sugar "processing facilities are currently operating near optimum utilization rates in all sectors of the industry.") The HFCS industry is, after fifteen years of expansion, now a mature industry, having achieved maximum product substitution. Its continued growth is linked, instead, to the soft drink market.

After listening to this chronicle of dramatic restructuring that has already occurred in the U.S. sweetener market, you may well ask yourselves, "What is next? What additional changes could the future possibly still hold in store?" I would like, now, to turn to what I believe are three important considerations for the future. They are:

- 1) The increasing importance of the cane sugar refining industry in assuring the availability of sugar to the American consumer;

- 2) The potential for declining domestic cane sugar production and its effect on the cane refining industry and U.S. trade policy;
- 3) The impact of glasnost on U.S. foreign policy with respect to sugar.

THE INCREASING IMPORTANCE OF THE CANE SUGAR REFINING
INDUSTRY IN ASSURING THE AVAILABILITY OF SUGAR TO THE
AMERICAN CONSUMER

Traditionally, the cane sugar refining industry in the United States has provided flexibility to the domestic sugar supply situation by either increasing output or throttling back on a year-to-year basis to make up the difference between domestic beet sugar production and total sugar demand. Whether we in the refining business like it or not, our function has been and will continue to be that of a residual supplier. This is a very important function in maintaining adequate and consistent supplies of refined sugar to U.S. food manufacturers and to the American consumer.

We all know that the beet sugar industry is subject to considerable vagaries of weather from year to year, whether it be drought, too much rain, freezes or diseases with such exotic names as virus yellows or curly top. The crop of 1988 is a good case in point. That year, the Department of Agriculture reported an increase in harvested acreage of 4% over the previous crop year. You will remember that 1987's crop was the bumper year when the crop reached nearly four million short tons, raw value. With a repeat of the excellent weather that occurred during the planting and growing season of 1987, the next crop could well have been expected to exceed four million tons. Then drought set in throughout the beet-growing regions and 500,000 tons, or nearly 15%

of the anticipated crop, was lost.

Fortunately, the cane refining industry was able to pick up the slack. It was able to import an additional 500,000 tons of raw sugar from the world market, refine it and deliver it to the consumer in a timely fashion. It was able to do this because there was sufficient refining capacity still in existence to add another half million tons to its annual output on very short notice.

The cane sugar refining industry ran at about 90% of capacity on average during 1989, to compensate for the short beet crop. With the beet crop for the 1989 season once again damaged by the lingering effects of the drought (the outturn now looks to be about 3,600,000 short tons, raw value), cane refiners will once again in 1990 be operating close to capacity. Remember that an annual capacity/utilization rate of about 90% means that on a seasonal basis, especially during the peak-demand summer months, the cane sugar refining industry is in effect operating at more like full capacity.

The abundance of raw sugar on the world market and the multitude of exporting countries means that cane refiners always have available sufficient raw materials to meet the requirements of American consumers. Even during periods of tight world raw sugar supplies, such as in 1974, there was always raw sugar available in the world market, albeit at a high price. U.S. refiners paid that price in order to keep consistent supplies of refined sugar available to American households and food manufacturing companies.

There is a lesson to be learned here. During the two most recent Farm Acts, those of 1981 and 1985, the expressed intention of the legislation was to insure supplies of food and fiber to the American people by supporting domestic agricultural

production, including sugar. In fact, the 1985 law was entitled, "The Food Security Act." Nevertheless, neither Act took into consideration the role of the U.S. cane sugar refining industry in assuring the continuity of sugar supplies to the consumer. In fact, since the inception of the 1981 Farm Act and the imposition of import quotas, ten refineries have closed their doors permanently.

In the short run, this has been a problem shouldered by the cane sugar refining industry; in the longer run, it is a problem that will threaten the availability of refined sugar supplies in the United States.

Of course, there is another potential source available for refined sugar supplies in the event of a short beet crop. Refined beet sugar from the European Community could be imported in quantity into the United States. I seriously doubt, however, whether domestic growers and processors of beet and cane or industrial sugar users in this country would welcome that occurrence. Domestic growers would not want to risk the chance that EEC whites would overwhelm the domestic sugar market. Industrial users would have to contend with uncertainty of supply, untimely shipments and quality and specification standards different than those to which they are accustomed.

Perhaps even more important are the trade policy implications. I question whether our policymakers want EEC refined sugar, which is produced and exported under an elaborate subsidy system, to flood U.S. markets.

These are important long-range considerations that must be kept in mind when the new Farm Bill comes up for deliberation next year. It is important that cane sugar refiners be recognized in the new Farm Bill as an important part of the domestic sugar

industry and that the Sugar Title of the new Farm Bill be composed in such a way that the decline in cane refining capacity that was forced by the 1981 and 1985 Farm Acts not be allowed to continue unchecked.

Without being too specific, there are two basic ways in which the U.S. cane sugar refining industry can be provided for in the new Farm Bill. Neither of these suggestions is mutually exclusive; in fact, they could both be enacted. One is the establishment of a minimum import quota, that is, a quantity below which the quota would not be allowed to fall. I suggest that an appropriate level ought to be at least 1.2 million metric tons. Such a number is reflective of the level at which the quota has been set for the average of the four most recent years (including the 1989/90 quota year). It is also a number that, combined with the current level of domestic raw cane sugar production (about 3.4 million tons), would provide cane refiners with an adequate supply of raw material. In other words, it would not force more refinery closures, an eventuality that a declining quota would surely induce. I realize that this recommendation leads to other Farm Bill considerations, such as potential marketing allocations. It is not my intention this afternoon, however, to offer a detailed Farm Bill program.

My second recommendation concerns the re-export business. Cane refiners do a certain amount of re-export business, that is, importing world priced raw sugar for refining for re-export. This business has been important for refiners as a means to utilize otherwise idle capacity when it is not required for the production of refined cane sugar to meet domestic demand in the event of a small beet corp. Without a viable re-export business, cane refiners' capacity/utilization during years of peak beet sugar output can fall to dangerously low levels. That leads to refinery closures. Optimally, the Congress should consider some sort of re-export program within the context of the Sugar Title of the Farm

Bill. At the very least, the Congress should recognize the importance of re-exports not only to the domestic sugar program but also to our balance of trade. It is important that our Government not take steps, either intentionally or through mismanagement, to curtail refiners' re-export business. This has happened in the past; it should not be allowed to happen again.

THE POTENTIAL FOR DECLINING DOMESTIC CANE SUGAR PRODUCTION AND ITS EFFECT ON THE CANE REFINING INDUSTRY AND U.S. TRADE POLICY

Over the past decade, domestic cane and beet production have both experienced growth. Beet sugar output has grown by about 40% since the early 1980's, with the exact number varying between 30% and 50% depending upon which base years are used. Raw cane sugar production has also risen, although not so dramatically. The rate of growth has been between 25-30%.

I do not foresee any significant expansion in beet sugar output in the future other than drought-related recovery for the simple reason that beet processing facilities are currently operating at near-peak capacity. I do not expect to see any major capital investment in the industry. Any growth in beet sugar output will be incremental, related to ongoing improvement in process efficiencies.

On the other hand, I am concerned that domestic raw cane sugar production may actually decline over the next five to ten years. Of the four sugarcane states, Louisiana is the only one that may expand acreage at all and any such increases are likely to be modest. Texas will probably hold the line at its current level of production. The Hawaiian crop is already in the process of decline. Over the past several years, mills have closed and acreage has been reduced as land and production costs have made alternative land use more economically justifiable. Poor weather

this season has exacerbated the decline in production, but it is not the only reason. I expect Hawaiian acreage to continue on the decline. The largest cane sugar producer, Florida, has probably just about reached its peak production capability, and I expect decline in this state over time. Land use questions and environmental concerns are poised to exert downward pressure on acreage levels.

For the cane sugar refining industry, declining domestic raw cane sugar output means that greater reliance on imported raws as a proportion of total throughput may be forthcoming. This outcome has important foreign policy implications. After years of shrinking access to the U.S. market, foreign exporters may once again come to view our market as an important outlet for their raw sugar. The reopening of the U.S. market to imported raws, which probably can be anticipated even now, should be noted by our trade negotiators as they prepare for the next round of GATT talks. Long-term, the United States has the opportunity to move toward freer trade in sugar without damaging domestic sugar-growing interests. Increased U.S. offtake from the world market may have the effect of strengthening world values over time, making the U.S. price support program in the long run unnecessary as a tool in assuring a comfortable level of domestically-grown sugar production.

The trend toward declining domestic sugarcane production ought to be taken into consideration by lawmakers as they consider the Farm Bill of 1990. Along with the establishment of a minimum import quota, provision should be made to assure that an adequate level of raw cane sugar supplies remain available to refiners, whether the source be domestic or foreign.

THE IMPACT OF GLASNOST ON U.S. FOREIGN POLICY WITH
RESPECT TO SUGAR

Is it possible that the current ferment in the Soviet Union and Eastern Europe will have an impact on the sugar market? I believe that this will be the case. There are two areas of change in the Eastern Bloc that are likely to have ripple effects reaching even as far as U.S. foreign policy with respect to sugar. Those two areas are: perestroika, that is, the restructuring of the Soviet economy, including agriculture; and the loosening of the relationship between the Soviet Union and its satellite countries. Of course, these two movements are interrelated.

First, perestroika. The reorganization and modernization of Soviet agriculture in order to increase productivity are essential to their economic and social well being. How can they expect to achieve economic health while so much foreign exchange is expended on the importation of agricultural products, including sugar. Even at world prices, and it is commonly believed that the Soviet Union pays far above the world price for Cuban sugar, annual Soviet expenditures for sugar imports amounted to something in excess of one billion dollars over the past twelve months. The Soviet Union has some of the world's best soil in the Ukraine and there is no reason why, with better management, they could not become self-sufficient in sugar over time. For comparison sake, look at how India's green revolution boosted sugar production as well as that of the grains. As the Soviet Union begins to approach self-sufficiency in sugar, Cuba will have to seek markets elsewhere for their sugar exports. What more logical market is there than the United States?

I believe that the Soviet Union is in a much better position to make rapid progress with respect to agricultural output

than with building up its industrial, particularly its consumer goods, sector. It has the most important inputs, land and labor, already available. It would take far less capital investment to improve the incentive structure for agricultural production than would be necessary to build an array of specialized light industries. It would be a much better choice to focus on improvements in agriculture, with the aim of becoming net exporters, and use the hard currency thus earned to import consumer goods. I expect that this is the direction that the Soviet leadership will ultimately choose.

The implications for sugar are tremendous. The USSR currently produces about nine million tons of beet sugar annually. With domestic consumption at about fourteen million tons, they must import about five million tons. Cuba supplies about three million tons annually, with the balance coming from the world market. If the Soviet Union were to keep its present sugarbeet acreage constant, but improved its yields to even half those of France, for example, they would switch from net importers to net exporters, producing over fifteen million tons of sugar per year.

Interrelated with the issue of self-sufficiency is the prospect of the loosening of economic (and maybe even political) ties between the Soviet Union and Cuba, just as Eastern Europe is beginning to move away from Soviet hegemony. The relationship between the Soviet Union and Cuba with respect to sugar exports is burdensome for both parties. The Soviet Union pays high prices for its sugar imports from Cuba, plus the additional burden of heavy freight costs. Cuba, on the other hand, owes considerable obligations to the Soviet Union, especially political and military ones. From an economic point of view, such a relationship is detrimental to both parties. Neither the Soviet Union nor Cuba will be successful in building up their economies, something they are both under pressure to do by their populations, while trade

decisions continue to be based on such uneconomic factors. Again, Cuba is likely to look toward the United States as an attractive alternative market for its principal foreign-exchange earning export, namely raw cane sugar.

I do not presume in this speech to recommend foreign policy decisions for our government with respect to Cuba, nor do I intend to attempt to read the mind of our diplomats at the Department of State. Nevertheless, as a member of the U.S. cane sugar refining industry, I think it is incumbent upon me to at least observe that, if foreign policy considerations made the entry of Cuban sugar into the United States a useful option, it would require the existence of a healthy U.S. cane sugar refining industry to stand ready to process that raw sugar and make such a foreign policy initiative feasible.

I have covered quite a bit of territory in this speech, from Hawaii, to Washington, to the European Community, to Havana, to Moscow. I hope it hasn't been too much. I would like to leave you with two thoughts:

- 1) After a decade of considerable restructuring in the U.S. sweetener industry, all segments of the industry (cane, beet, corn) are stable and healthy;
- 2) It is important that the Sugar Title of the new Farm Bill be constructed in such a way as to preserve this stability and health, for all segments of the industry including cane sugar refiners. It is important for the American consumer, and it is important for those in government responsible for the formulation of U.S. foreign policy.

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THE SUGAR POLICY HORIZON Carol M. Brick-Turin World Perspectives, Inc.

Introduction

Thank you so much for the chance to be here with you today to speak about the sugar policy horizon. U.S. sugar policy has been a topic for discussion at the Outlook Conference year after year because the price support and quota program remain so controversial and politically complex. This year is no exception.

In fact, the controversy has recently been heightened by the June GATT Council decision to support Australia's complaint against the U.S. administration of its sugar import quota. Furthermore, U.S. sugar policy will be a focus of debate during the drafting of the 1990 farm bill next spring, and the negotiation of long-term agricultural reform within the framework of the Multilateral Trade Negotiations expected to be concluded at the end of 1990.

What I would like to do is to assess where we currently are on the policy horizon -- focusing on the 1990 Farm Bill, the U.S.-Australia bilateral GATT dispute, and the Uruguay Round of Multilateral Trade Negotiations -- and what options I see for the future.

The 1990 Farm Bill

First, we should remember that politicians don't like to act--particularly if their actions can lose votes for them. So they need a crisis to move policy forward. This theory of crisis management relates in particular to agriculture where politicians feel compelled to respond to short-term down turns in markets when faced with election contests.

In 1985 members of Congress and the Administration were facing severe financial stress on farms, extremely high farm program costs, very high crop surpluses, a collapse in export markets, and growing concern about soil erosion and conservation practices. As a result, we saw a Food Security Act which focused on cutting loan rates and target prices, reducing acreage at record levels and pursuing aggressive export policies.

The situation in U.S. agriculture today--in terms of both market and economic conditions--is very different than that experienced during the drafting of the 1985 Bill. This year there is no major agricultural crisis, and therefore, there are not likely to be any radical proposals for major changes in current farm policy, with some exceptions. What is more likely is a continuation of the basic policies which were crafted in the 1985 Food Security Act. This doesn't mean a steady reduction on commodity loan rates and target prices, but rather "dropping anchor" where we currently are, with some modifications such as planting flexibility.

It's possible that the Bush Administration will not present a formal detailed farm bill proposal to Congress as has been past tradition. Because Democrats hold the majority of seats in the Congress, a Republican bill from the Administration would clearly be considered "Dead on Arrival" if sent up to the Hill. It would limit the Administration's flexibility by dampening ongoing negotiations among agencies, and would provide fixed proposals open to Congressional disapproval. It is more likely that Agriculture Secretary Yeutter will send up to Congress the broad objectives and proposals that the Administration seeks to achieve in the legislation.

In terms of timeframe, Chairmen of the Agriculture Committees of both the House and Senate are seeking to have non-commodity provisions of the bill marked up--or passed by the committees--by the end of 1989. Hearings on the sugar title in the House are scheduled for early winter, and those in the Senate are likely to be on the same timetable. The leadership hopes to have the commodity titles out of committee by mid-spring, with the objective of getting the 1989 farm bill enacted by late spring of 1990.

Is this likely? Probably not, given the recent history of farm legislation. Bills have historically been signed into law at the very end of the calendar year in which the old legislation expires. However, might we see a farm bill prior to Christmas of 1990? Possibly. I don't disagree that as a result of the crisis management theory I've already discussed we'll likely see a bill later rather than sooner. However, there are some unique circumstances this year. Specifically:

-- There is interest in both chambers of Congress to complete the bill prior to the November Congressional elections;

-- Unlike the previous two farm bills, this Congress is in its second year of the session (rather than the first), so that the mechanics are running more smoothly;

-- Major changes in farm programs, with the possible exceptions of sugar and dairy, are unlikely.

And that brings us to the sugar title of the Farm Bill.

At one end of the spectrum we have the school of thought that believes that "...there is something wrong with the U.S. sugar program...the time to change the program is now...the Sugar Supply and Stabilization Act introduced by Senators Bradley and Roth, and Congressmen Downey and Gradison is a rational, workable approach..." bringing the loan rate down to \$.12/lb. over a four-year period.

At the other end of the spectrum we have those who believe that an \$.18/lb. loan rate is too low. Testimony was offered during the first Farm Bill field hearings held by the House Agriculture Subcommittee on Cotton, Rice and Sugar out in Colorado, urged that "...the sugar loan level should be increased..." arguing that inflation has effectively reduced the support level during the current farm bill.

Refiners very recently urged, among other things the establishment of a Congressionally-mandated minimum import quota, possibly coupled with marketing controls.

I don't expect the producer side of the industry to table its policy platform until early next year. The Administration, I suspect, will oppose the imposition of marketing controls, yet demand that any legislation be written to comply with our GATT obligations, and Congress hasn't really focused yet on how to change the sugar title.

So, what do I see coming out of this? Although it's a bit premature to speculate, let me make a few observations. First, I think the equity issue--treating sugar similarly to other crops that are likely to take further reductions in loan rate levels--will surface. The extent to which it will become an issue will depend on the severity of budget-driven cuts that other crops will have to take in their loan rates and target prices. Of course, sequestration, or across-the-board spending cuts, would include payments in the sugar sector. In addition, the 1990 budget reconciliation package can serve as a vehicle for farm policy legislation.

Second, members of Congress seem to be moving on a schedule to draft the 1990 farm bill independent from the Uruguay Round of Multilateral Trade Negotiations. In fact, they keep saying that they will not let foreigners write our farm policy, but will write a farm bill independent from the GATT negotiating process. This means that they are not likely to write any major conditional terms in regarding sensitive farm programs. Rather, they will write a multi-year bill and then change it if the Uruguay Round produces internationally agreed-upon reform of farm policy.

Finally, if Congress is truly committed to writing a bill which is GATT consistent, its options are limited. Alternatives would include the establishment of domestic production or marketing controls in conjunction with the current quota system, implementation of a Section 22 quota or tariff-rate quota system, or the imposition of revised levels of import duties and fees. I'd now like to examine these options within the context of the U.S.-Australian bilateral sugar dispute.

U.S.-Australian Sugar Dispute

As most of you know, this past summer the GATT Council adopted a panel report on the Australian case challenging the legality of administration of the U.S. sugar import quota imposed under the authority of the Tariff Schedules. It is important that the operation of the sugar price support program per se was not challenged. The panel supported the Australian position that the U.S. raw/refined import quota is inconsistent with U.S. obligations under GATT international trading rules. Specifically, the panel found the quotas to be

inconsistent with Article XI (concerning Import quotas) and Article II (concerning qualifications to concessions in the tariff schedules of contracting parties). The headnote quota is considered to be inconsistent with Article XI because, among other things, it is not administered in conjunction with domestic production or marketing controls.

The U.S. accepted the report and is therefore expected to end the restrictions or to administer the program in compliance with GATT rules. There are a number of options which the Administration could consider in response to the panel recommendation on the Australian case. In summary, they are as follows:

1. Dismantle the current raw/refined sugar import quota authorized by the Tariff Schedules and protect prices with duties and fees by;

--Increasing the import duty above its current level of 2.81 cents per pound (assuming this level is no longer bound);

--Imposing the maximum Section 22 fee (50 percent ad valorem value of the product) on both raw sugar (currently suspended) and refined sugar (currently 1 cent per lb);

--modifying the duty exemptions granted under GSP and CBI.

This option can be accomplished without a bill from Congress, if the Administration were to interpret the laws in such a way that would result in the current duty being unbound (i.e.; without an upper limit). Also, preferential treatment could be given to CBI suppliers by leaving their duty exemption in tact. However, politically there would be opposition from the Agriculture Committees. Because the use of duties and fees is revenue-related, the program would fall under the jurisdiction of the Senate Finance and House Ways and Means Committees. This joint jurisdiction, by committees which are less in favor of the sugar program, would dilute the historically strong power base of the Agriculture Committees.

Furthermore, because the U.S. is committed in the Uruguay Round of multilateral trade negotiations to progressive substantial reductions in import barriers through tariffication, price protection through duties and fees would ultimately be at risk.

Finally, it's important to note that under current CBI legislation, the Dominican Republic and Guatemala alone are given duty-free treatment for up to one million tons of sugar. Although these duty-free levels are currently limited to whatever the actual headnote quotas are, if the quota system were to be dismantled, these two suppliers are authorized to jointly ship levels which would risk forfeitures. Therefore, Congress would have to grapple with modifying preferential import treatment to CBI suppliers.

2. Modify the current raw/refined sugar import quota authorized by the Tariff Schedules making it GATT consistent by:

--establishing a tariff-rate quota which would set specific levels of sugar which could enter duty-free, above which prohibitively high tariffs would be set.

This option can also be accomplished without a bill from Congress, if the Administration were to interpret the laws in such a way that would result in the headnote language—which has now been enacted by Congress—giving the President the authority to do so. However, politically there would be opposition from the Agriculture Committees because of the reasons outlined above regarding jurisdiction of the Senate Finance and House Ways and Means Committees and the Uruguay Round of trade talks.

3. Replace the current raw/refined sugar import quota authorized by the Tariff Schedules with a raw/refined import quota under Section 22 of the Agriculture Adjustment Act of 1933 and:

--permit at least 50 percent of the total quantity imported during a representative period, as required by Section 22, to be determined by the President. This period would likely be the same as that used to determine current quotas, 1975-81, which would require imports to be set in the two million-ton range.

--rescind the current raw/refined import fees authorized under Section 22 (Section 22 does not permit the imposition of simultaneous fees and quotas).

Although this option could be accomplished by the Administration without Congressional involvement (rescission of fees could be accomplished through a presidential proclamation) it would not address the issue of the inherent restrictive nature of quota system, regardless of which statute is used for its authorization. Moreover, it is the U.S.'s use of the Section 22 waiver that is currently being challenged by the EC in the GATT dispute settlement process. Additionally, and very importantly, the level of quota which would likely result would risk forfeitures of sugar to the Commodity Credit Corporation.

4. Maintain the current raw/refined sugar import quota authorized by the Tariff Schedules, making it consistent with Article 11 of the GATT by:

--imposing domestic production or marketing controls;

--maintaining imports at a level would be proportionate to domestic production.

Domestic production or marketing controls could be imposed by the Administration only with a legislative mandate. However, a big question remains as to whether the establishment of domestic marketing controls would, in fact, make the program GATT consistent. Article XI of the GATT requires that in order for quotas to be imposed not only do production/marketing controls need to be in place but that in addition, three other requirements are met. The requirement which may be problematic is the one which says that the domestic controls must be placed on "like products", that is, products like the ones subject to import restrictions. Historically, this has meant that the two products must be almost identical. Using that strict definition, raw and refined cane and beet sugar, for which there are import restrictions, would not be the same as sugarcane and sugar beets, on which production or marketing controls would be placed.

The interpretation of GATT Article XI in the case of sugar has not yet been sorted out by the Administration, but will certainly influence policy options. Furthermore, USDA Secretary Yeutter has voiced his opposition to the imposition of marketing controls, which could stir controversy if Congressional leaders consider them as an alternative to a reduction in loan rates for sugar program reform in the context of the upcoming farm bill.

There are a number of other complex legal questions which have not yet been entirely sorted out. For example, there is a question as to the legal status of the headnote authority under which the current quota is authorized. Under the TSUS it was incorporated into the tariff schedules by proclamation. However, the tariff headnote was enacted by Congress as part of the Harmonized Tariff Schedules (HTS-Additional U.S. Note 2, Chapter 17), and the HTS was enacted by Congress as part of the 1988 Trade Bill. Did this change the status of the tariff headnote from a Presidential Proclamation to a statute? If so, the statute specifically allows the President the authority to "proclaim...particular rate(s) and...quota limitations...". This would mean that the President could impose a tariff/quota and increase tariffs above the statutory maximum without a Congressional mandate.

Another consideration is the impact of the "no-cost mandate" contained in the 1985 Food Security Act. Would the President be in violation of Section 902 of the Act if he does not maintain the quota system, assuming Section 22 controls would not prevent forfeitures? I certainly don't have the answers to many of these questions, but I think that they will be crucial in the formulation of future sugar program reform.

Uruguay Round

Now let's take a look at the chances for a successful conclusion of the Uruguay Round talks in 1990 and what that means for the sweetener industry.

GATT members have committed to putting all their proposals for agriculture on the negotiating table by the end of 1989, so that serious work can begin on trying to bridge differences during 1990.

A Comprehensive Long-Term Agricultural Reform proposal was presented by the U.S. delegation to the Uruguay Round Agricultural Negotiating Committee in Geneva on October 25. The U.S. proposal provides specific measures to achieve the objectives in four areas outlined below. Within each of these areas are provisions on rules and disciplines, and additionally there is language dealing with special treatment for developing countries. The basic provisions of the proposal are as follows:

- I. Market Access - Substantial progressive reduction in import protection by: converting all non-tariff barriers to bound tariffs and then substantial reductions in these tariffs over ten years. A tariff rate quota transition is proposed for non-tariff measures, with a safeguard provision provided through a tariff snap-back based on a volume trigger.

II. Export Competition - Elimination of export subsidies and prohibitions through applying industrial rules to agriculture and phasing out export subsidies over a five-year period. Short-Supply export restrictions would be eliminated effective January 1, 1991, with a phase-out of export tax differentials over a five year period.

III. Internal Support - Developing new GATT rules and disciplines covering all trade-distorting subsidies and eliminating over time the most-trade distorting policies. Internal support policies will be divided into three categories--policies to be phased-out, policies to be disciplined and policies permitted.

IV. Sanitary and Phytosanitary Regulations and Barriers - To establish an international process for settling trade disputes involving food safety, animal and plant health, and to promote harmonization of regulations.

Those provisions which would most directly impact sweeteners include:

--the elimination of GATT Article XI: 2(c). This article permits import restrictions if, among other things, domestic production or marketing controls are in place. It is because of this requirement that the U.S. exercises its Section 22 waiver.

--the binding of tariffs, including those resulting from conversion of non-tariff barriers to tariffs, on January 1, 1991 and reduction over a 10-year transition period to final bound rates to be negotiated.

--an accelerated reduction of import barriers and internal supports by developed countries on products of priority export interest to developing countries.

Tariff-rate quotas would be used to permit a transition from extremely high levels of import protection provided by some current non-tariff barriers. The initial quota for each commodity would be set at a level equivalent to the level of imports existing in 1990 or some recent historical period, or a negotiated minimum level of imports in the case of import prohibitions or virtual prohibitions. Tariff rates would be expressed on an ad valorem or per unit basis and would be calculated on the basis of average prices for 1986-88.

A special agricultural safeguard mechanism would operate to protect against import surges during the transition. Once the safeguard mechanism is triggered, a country would be allowed to revert back to a specified level of tariff protection for the remainder of the year. At the end of the year, the tariff snapback would be terminated, and further tariff reductions would be implemented in accordance with the agreed schedule.

Reaction to the U.S. proposal was generally favorable, although the EC expectedly gave a public negative response. In fact, the EC Commissioner for Agriculture Ray MacSharry called the proposal a "step backward". This is largely due to the U.S. proposal to "eliminate" export subsidies over five years. As you will remember, the EC has consistently hammered against the initial U.S. proposal to eliminate all subsidies and trade barriers by the year 2000 as unrealistic.

it is important to remember that this proposal is a negotiating document. It provides both the broad and specific parameters within which the U.S. is prepared to negotiate. The proposal also recognizes concerns about severe market adjustment as market access is expanded by providing for meaningful safeguards—to protect domestic farm sectors against import surges during the transition.

Perhaps the key to this negotiation is the fact that there already has been a commitment by the negotiating parties to "substantial progressive reduction" in agricultural support and protection. At the end of the day, success in the round will be determined by whether negotiating parties meet this objective. Progressive reduction means consistent and sustained lowering of agricultural support and protection. The U.S. proposal calls for a ten-year time frame. We believe the EC also will be looking at that time horizon regarding its commitments. The real test will be how negotiators reach agreement on what is "substantial".

Clearly there will be a need for Congressional support of the negotiations, and the package won't win Congressional favor unless there is political momentum for the reform process.

Conclusion

It is important to note that efforts towards sugar program reform pursued through the farm bill, the bilateral dispute settlement process, and the multilateral process are not mutually exclusive. In other words, the Administration could address the issues posed in the bilateral dispute settlement process while at the same time working toward program reform through the upcoming farm bill as well as in the multilateral trade round. However, with the recent decision by the USDA to extend the current quota year through September 1990, I believe that we will not see structural reform of the quota program before then.

In fact, I believe that we will see a 1990 farm bill signed into law in the late fall of 1990, that such a bill will address the GATT case by making the sugar title consistent with our international obligations, and that further reform, if required by the outcome of the Uruguay Round of trade talks, will be written into a revised farm bill at the conclusion of the Round.

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FINANCE OUTLOOK: STEADY-STATE FARM ECONOMY

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The outlook is for a steady-state farm economy in 1990. Stability is due to several factors that tend to offset each other: higher crop production but lower fall prices, higher crop expense but lower feed bills, higher total receipts but lower Government payments. Net cash income will be more than \$50 billion for the fourth consecutive year. With cash income in the mid-\$50 billion range, most farmers will again make financial progress next year.

Equity gains of about \$30 billion could occur as land prices are forecast to rise 4-7 percent next year. Nearly two-thirds of the equity-loss that occurred in the mid-1980's is projected to have been recovered by the end of 1990. This \$150 billion equity "recapture" illustrates the breadth of the recent farm recovery.

Several "negatives" still cloud this Outlook. Crop prices are likely to average 10-20 percent lower for feed-grains and oil-seed crops in 1990. If bumper crops are harvested cost-price pressures could develop for cash grain farmers. About one of every ten commercial farmers remains financially vulnerable. Finally, the farm sector remains critically dependent upon Government commodity programs, indicating U.S. agriculture has not fully regained its competitive edge.

Cattle and Hogs: Key Livestock Profit Centers in 1990

A 0-4 percent rebound in hog prices, and 1-3 percent higher cattle prices will ensure that 1990 is another banner year for the livestock sector. Livestock receipts are forecast to stabilize at the record 1989 level of \$82 billion. Poultry and dairy may become weaker profit centers, as dairy prices fall 7-9 percent, and poultry prices decline as much as 9-12 percent.

- o Poultry production is projected to expand 5-6 percent, and will have grown one-third since 1984. Due to lower prices, dairy sales could fall \$1 billion from 1989's record level.
- o Both cattle and hog sales could grow by \$250-\$500 million, resulting in record red-meat sales of about \$47-\$48 billion.

Cheaper feed prices will increase the steer-corn ratio from 30 to about 35, and the hog-corn ratio from 18 to around 21 between 1989 and 1990. The combination of slightly higher meat prices and lower feed expense will result in the red-meat complex being the major profit center in the 1990 agricultural economy. (The hog-corn and steer-corn ratio show how many bushels of corn are equivalent to the value of 100 pounds of hogs or cattle.)

Higher Production Leading to Record Crop Sales

Farmers may sell \$3-\$4 billion more wheat and feed grains next year. Fifteen percent growth in receipts from these commodities would lead the crop sector to record the highest level of total sales ever. Crop production is forecast to be 20-25 percent above drought-affected 1988. At the same time, 5-10 percent lower crop prices, that could be even weaker in the fall if crop yields return to trend (e.g. corn yields above 120 bu. per acre), are the area of most concern to continued financial improvement in the farm sector.

- o The impact of price weakness is best illustrated by soybeans. Receipts in 1990 are likely to be \$2 to \$3 billion lower than two years ago as average annual soybean prices have fallen 25 percent.
- o With very low stockpiles, wheat and cotton are currently the strongest crop commodities. Sales are likely to be more than \$.5 billion higher for cotton and more than \$1 billion higher for wheat.

Thirty bushel higher corn yields per acre in 1989, and likely gains in productivity next year could result in nearly \$13 billion corn sales throughout 1990. This is a 50 percent gain over 1987 sales when prices averaged only \$1.55 per bushel, compared to the \$2.00-\$2.25 corn prices now projected for January-December, 1990.

Commodity Sales Could Exceed \$160 Billion For the First Time Ever

The combination of record-high crop sales and record-tying livestock sales is projected to raise total sales by \$2-\$4 billion to a range of \$160-\$163 billion in 1990. As has been the case since 1987, sales growth has been the "engine" of the recovery in the farm economy. Almost all farm enterprises have shared in growth, resulting in an evenly-balanced farm recovery process. Sales of soybeans and hogs are the only major commodities projected to be unchanged or lower in 1990 as compared with 1987 (the first year of broad recovery). But, hog profits were record-high in 1987, and soybean profits were near-record high in 1988. Thus "profit-center" leadership has rotated during the current 4-year recovery, enabling finances to improve broadly.

Government Direct Payments Could Fall 12 to 16 Percent

Direct payments to farmers are forecast to fall by \$1 billion or more as disaster assistance declines from nearly \$3 billion in 1989 to less than \$1 billion in 1990. The trend to lower corn prices and to a smaller relative decline in wheat prices will result in nearly \$2 billion higher payments for these commodities. However, recent price strength in cotton and rice will

lower payments for these commodities by about \$1.5 billion in 1990. Thus the combination of lower rice, cotton and disaster payments will more than offset higher wheat and feed grain deficiency payments during 1990.

Net Government outlays to farmers, including Commodity Credit Corporation (CCC) transactions, will comprise about six cents of every dollar of gross income farmers put in their pockets next year. This is half the level of 1987, and about the same share as has occurred on average since the 1960's.

- o While the trend in direct payments is down, Government supports continue to play an important stabilizing role in U.S. agriculture.
- o Government payments in the \$8-\$11 billion range indicate that the U.S. farm economy has not totally recovered its competitive edge in world markets.
- o Nearly 20 percent of net Government outlays will be directed to soil and water resource conservation programs in 1990.

Government subsidies remain unusually high for the fourth consecutive year of farm recovery. Given the trend to declining target prices under the 1985 farm legislation, future levels of Government supports pose one of the largest issues regarding the financial health of farmers in the 1990's.

Lower Feed Costs Keep Farm Expenses Stable

One of the most positive trends in the financial outlook is the leveling off of farm expenses. A 15 percent projected decline in feed costs will offset 2-4 percent increases in fertilizer, fuels, repairs and depreciation.

- o Cash expenses are forecast at \$119-\$122 billion in 1990, about equal with \$121 billion in 1989. After declining during the mid-1980's, cash expenses have now surpassed the 1984 record of \$119 billion.
- o Interest expense is projected stable at \$15 billion for the fourth consecutive year, illustrating farmers more conservative approach to financing at the end of the 1980's.

Strict cost-control measures continue to pay dividends to farmers, resulting in higher farm sector incomes than would have occurred had farm expenses continued to rise by \$7-\$8 billion annually. While commodity receipts are projected to be about \$25 billion higher in 1990 than in 1985, cash farm expenses will be only \$1-\$2 billion higher over the same 5 years.

The farm expenses in this report reflect recently released 1987 Census of Agriculture statistics. A discussion of this quinquennial benchmark process will be provided in the December, 1989 issue of the USDA Agricultural Income and Finance Situation and Outlook, and in the USDA January/February Agricultural Outlook report.

Steady-State Farm Income in 1990

Two to four billion dollar higher crop receipts will push cash income up 2 to 4 percent next year. Cash income is projected to rise to the mid \$50 billion range even though direct Government payments may decline \$1-\$2 billion. Cash income in the mid-\$50 billion range compares favorably with cash income in the mid \$40 billion range five years ago. Net farm income may fall 2 to 5 percent next year as next fall's production is projected to be subject to some additional price weakness.

Farm Asset Growth Continues

The value of U.S. farm assets (excluding operator households) is forecast at \$849 billion on December 31, 1989, up 4.8 percent from 1988 and at \$880 to \$890 billion on December 31, 1990. Boosted by relatively high returns, the value of farm real estate assets increased by an estimated \$40 billion in 1989, and accounted for most of the growth in farm asset values.

Nonreal estate asset values are forecast to rise by about \$2 billion to \$200 to \$205 billion in 1990. The anticipated 1-percent increase in nonreal estate asset values in 1990 is due to higher values of farm machinery and equipment, farm financial assets, and livestock and poultry values. Crop inventory values are forecast to drop by about \$1 billion in 1990.

Only A Moderate Increase in Farm Debt

As land values continue to strengthen, lenders may become less concerned with the likelihood of eroding loan collateral values, farmers may become less reluctant to incur debt to purchase land, and currently indebted farmers may seek to refinance existing short term debt over a more manageable longer term. As a result of these influences, farm borrowing will likely increase slightly in 1990, producing an anticipated \$1-2 billion increase in total farm business debt. The \$1 billion decrease in total debt during 1989 is expected to mark the end of a 6-year trend of debt retirement.

Farm Credit System loans should increase by about \$1 billion in 1990, the first annual increase since 1982. Debt held by commercial banks is expected to increase about \$2 billion in 1990, due to an adequate supply of loanable funds and the anticipated emergence of the secondary mortgage market.

- o The final standards for qualifying loans to be sold on the secondary mortgage market should be determined early in 1990.
- o Banks currently hold over one-third of all farm debt, while the Farm Credit System holds approximately one-fourth. This represents a reversal of 1984 market shares of these two lenders.
- o Farmers Home Administration debt levels could decline by as much as \$2-\$4 billion during 1990, depending on the speed with which delinquent loans are restructured and/or written off.

Farm debt held by life insurance companies is expected to be relatively stable through 1990. These farm mortgage lenders will continue to shift new loan origination emphasis away from the Midwest and toward the more diversified agricultures of the Southeast and West.

Farm real estate debt should increase by about \$1 billion in 1990, spurred by increased lending to finance farmland sales. The continuing improvement in land values will both maintain the interest of nonoperator investors, and encourage financially sound farmers to expand their operations. As lender inventories of previous foreclosures have declined, there is reduced incentive for lenders to offer concessionary financing to move these properties.

Demand for nonreal estate loans should remain high during 1990, as relatively large planted acreages will sustain high demand for most inputs, and farmers continue to replace an aging machinery capital stock. Farmers appear to have adequate cash reserves to finance much of this investment, however, and nonreal estate debt outstanding should increase by less than \$1 billion.

Equity Recovery Continues

Farm equity is expected to rise by about 6 percent in 1989 to \$713 billion. This would be the third year of increase following a 35-percent decline from 1980's peak. Farm equity is projected to be \$740 to \$750 at the end of 1990 (up about 1 percent in real (\$1982) dollars. Farm equity growth has been due to increased asset values and decreased amounts of debt used to finance operating expenses and purchases of land, machinery and equipment. This equity strengthening is consistent with long-term farm financial recovery.

Farm Sector Returns

Adjustments in farm asset values, returns, and cash flow continue to support relatively high rates of return to farm assets and equity. The total real rate of return on farm assets, including returns from current income and real capital gains, is expected to be 5.9 in 1989, and 4 to 5 percent in 1990. Returns to operators, and residual income to farm assets and to equity are expected to fall slightly.

Overall, the financial position of farmers is stronger than at any time since the early 1980's. This is largely due to cautious investment behavior, effective cost control, increased cash financing, and continued restructuring and write-offs of outstanding debt.

Farm Sector Not Problem Free

The income and finance conditions highlighted in this Outlook are generally positive for the farm sector. But major economic problems continue to affect farmers. The most critical difficulties center on the 70,000 commercial farmers that remain financially vulnerable. This group, constituting one of every ten commercial operators, had inadequate equity and/or cashflow when surveyed in early 1989. Unanticipated weakening of the farm economy would jeopardize the survival of many of these stressed farmers.

- o Crop profits may decline substantially for feed grain producers next fall if yields return to their longrun trend and demand fails to grow further.

- o Severe pressures to remain cost-competitive in crop export markets may continue through the early 1990's.
- o The farm sector remains critically dependent on Government price supports.

The two most serious present concerns are inter-related. First, should yields rise substantially, there would be increased price weakness for cashgrains. Second, farm-program price/income support costs remain relatively high. The best signal that the farm sector has fully recovered will be a better balance between supply and demand that results in low Government payments.

But, Economic Fundamentals Continue to Strengthen

The pulse of the farm economy will be much stronger as we enter 1990 than it was during the mid-1980's. Improvement in the factors below lead us to believe that the farm sector will continue to be stable throughout the early 1990's.

- o Farmers have learned cost control. This is evidenced since 1982 (when land values peaked) by a 42 percent decline in real debt, a 33 percent fall in real capital purchases, and a 20 percent decline in real expenses. In contrast, 1990 real net farm income is about 50 percent higher than in 1982.
- o Buoyed by the cheaper U.S. dollar (down as much as 40 percent against major currencies since peaking in 1985), farm exports have risen by \$14 billion since 1986. Further, the dollar is unlikely to soon inflate, given concerns about the large U.S. trade deficit.
- o Stockpiles of corn, wheat and soybeans will be 4-5 billion bushels lower next summer than in mid-1987 (when stocks were very large). But, a rapid buildup of stocks is unlikely. Prices are more attuned to world markets and the Conservation Reserve Program is a stabilizing influence on production.
- o The 1980's restructuring of assets and debts was very costly for farmers and their families. The silver lining is that assets and outstanding debt are now more concentrated among fiscally sound producers.

In summary, the economic factors that led to the financial crisis of the mid-1980's (high real interest rates, escalating costs, high exchange rates, increased export competition) set the stage for the economic revitalization of the farm economy in the late 1980's. This economic "rule of alternation" will likely lead to a more stable farm sector in the early 1990's.

(1) Stable Livestock Receipts

	1988	1989	1990
	Billion dollars		
Total	79	83	80-83
Cattle	36	37	37
Dairy	18	19	18
Poultry	13	14	14
Hogs	9	9	10

(2) Record Crop Receipts

	1988	1989	1990
	Billion dollars		
Total	73	75	77-80
Corn	10	11	13
Soybeans	12	11	10
Wheat	6	7	8
Cotton	5	5	5
Fruits/Vegetables	19	19	19

(3) Farm Expenses Stable

	1988	1989	1990
	Billion dollars		
Total	132	141	139-142
Feed, seed, calves	37	41	38
Fertilizer, chemical, fuel	18	22	23
Interest	15	15	15
Depreciation, rent	29	30	31
Repair, labor, other	32	34	35

(4) Stable Farm Income in 1990

	1989	1990
	Billion dollars	
Net cash income	53	52-57
Receipts	158	160-163
Direct payments	11	8-11
Cash expense	121	119-122
Net farm income	48	44-49
Inventory change	6	1-3

(5) Farm Equity Continues to Improve

Year	Current dollars			Deflated dollars (1982) 1/		
	Assets	Debt	Equity	Assets	Debt	Equity
	Billion dollars					
1987	765	143	622	652	122	530
1988	810	138	672	668	114	554
1989*	849	136	713	650	109	561
1990*	880-890	134-140	740-750	668-678	103-111	560-570

1/ Deflated by the GNP implicit price deflator, 1982=100.

*Forecast.

(6) Lower Total Returns to Assets and Equity

Year	Return to assets			Return to equity		
	Income	Real capital gains	Total	Income	Real capital gains	Total
1988	4.5	3.0	7.5	3.2	4.5	7.7
1989*	4.7	1.2	5.9	3.5	2.3	5.8
1990*	4-5	0-1	4-5	3-4	1-2	4-5

1/ Excludes operator households. The rates of return to assets and return to equity are calculated using the average of the current and previous years' assets and equity.

*Forecast.

(7) Financial Stress Has Stabilized

	1986	1987	1988	1989
	Thousands farms			
Financially vulnerable farms				
Commercial farms	105	98	66	68
Small farms	110	105	76	73
	Billion dollars			
Debt held on vulnerable farms				
Commercial farms	33	31	20	20
Small farms	8	10	6	6

(8) 1990 Bottom Line: Steady-State Farm Economy

- o Record commodity receipts
 - o Continued strong livestock profits
 - o Low crop stockpiles and strong exports
 - o Stable farm expenses and incomes
 - o Most farmers will make some financial progress
-

(9) Major Problems in Farm Sector

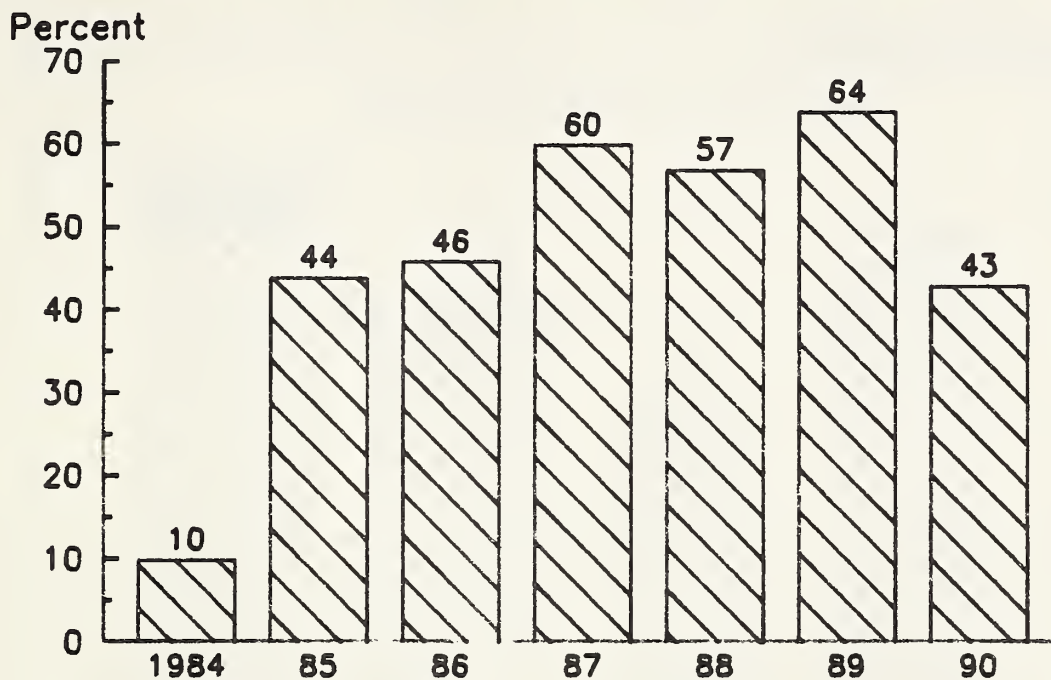
- o 60,000 financially vulnerable commercial farms
 - o Crop profits now declining
 - o Level of government payments remains relatively high
 - o Severe pressures to remain cost-competitive in exports
-

(10) Will Recovery Continue Through Early 1990's?

Strengthened economic fundamentals suggest:

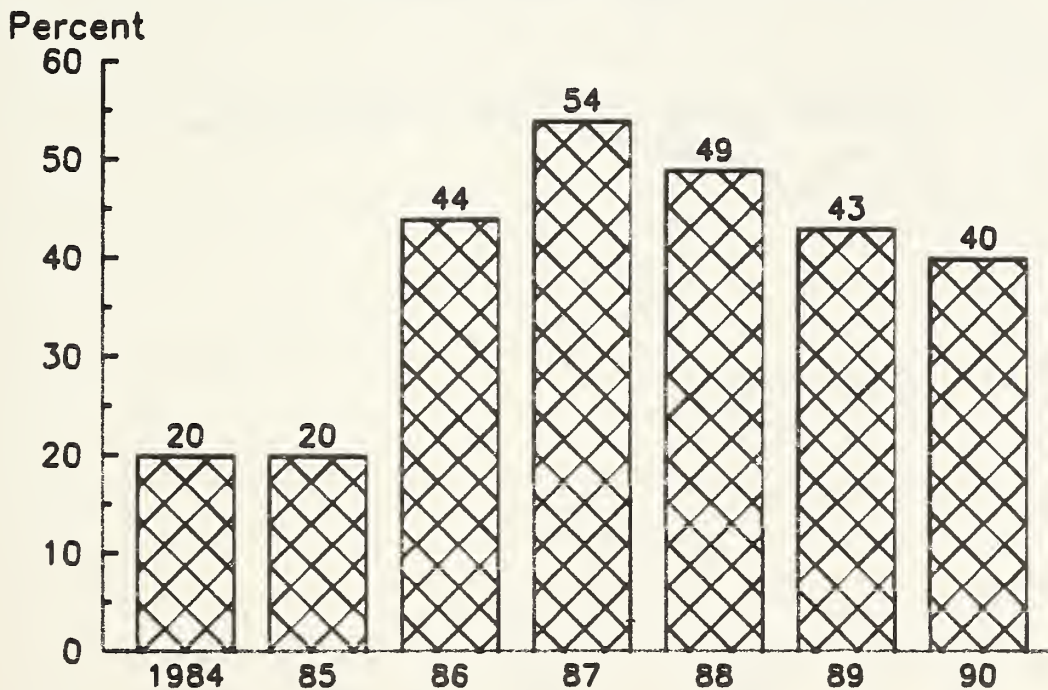
- o Hard finance lessons of mid-1980's: lead farmers to be cautious investors
 - o Effective cost control: farmers using variable inputs carefully
 - o Exports and stocks likely to remain in better balance due to dollar devaluation and less rigid U.S. commodity prices
-

Commercial Corn Farms That Can Cashflow A Land Purchase



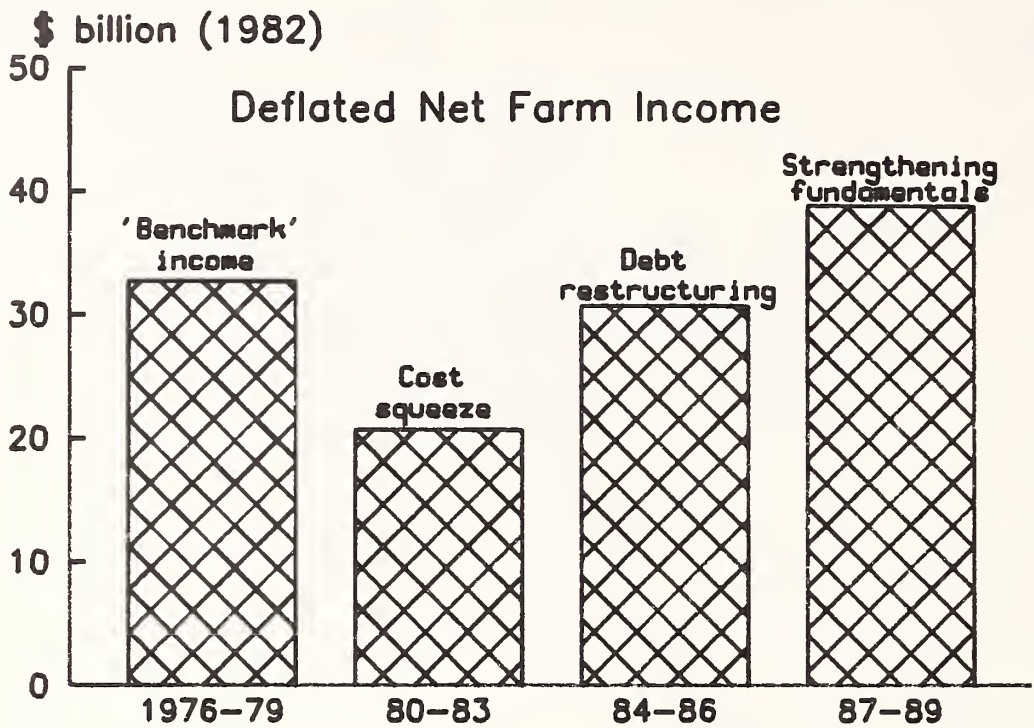
25 percent down payment.

Commercial Wheat Farms That Can Cashflow A Land Purchase

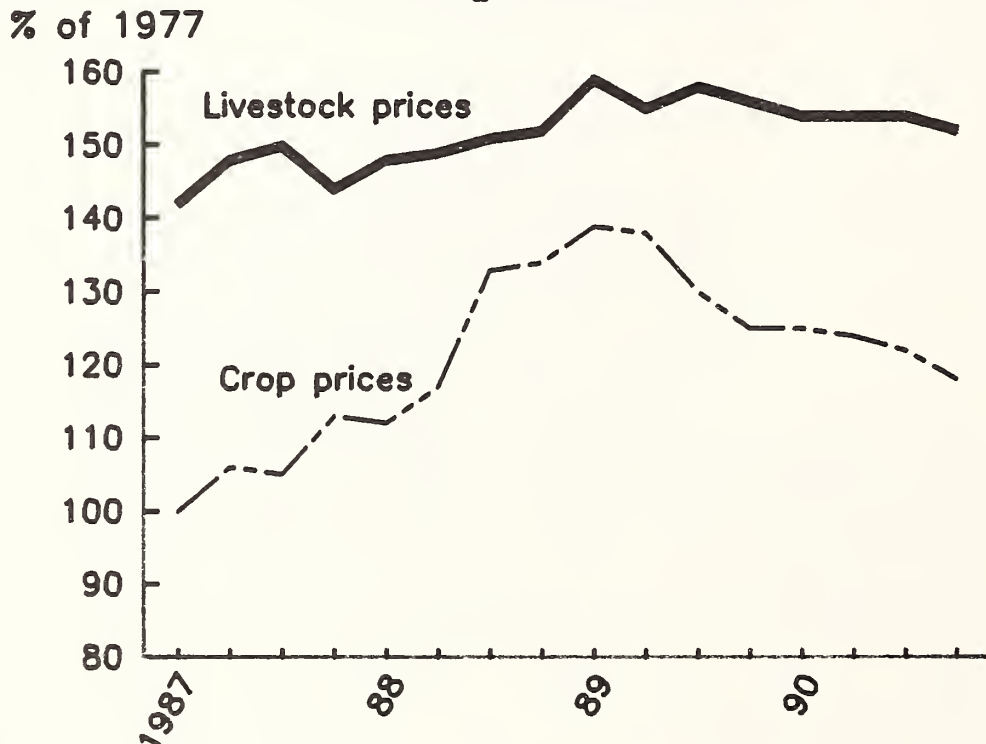


25 percent down payment.

Late 1980's Show Strengthened Fundamentals



Livestock Prices Stable But Crops Decline



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OUTLOOK FOR FARM INPUTS

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Farmers are expected to spend between \$118 and \$121 billion in 1990 for agricultural inputs, representing an estimated 1 to 2 percent decline from 1989. Even though planted acreage will rise modestly in 1990 resulting in greater input consumption and slightly higher manufactured input prices paid by farmers, feed cost declines will reduce aggregate input expenses from 1989 levels. On the other hand, capital expenditures are expected to increase 4 to 5 percent continuing a trend which began in 1987.

Agricultural inputs is a diverse topic encompassing land, seeds, fertilizers, pesticides, farm machinery, repairs, feeds, labor, credit, livestock, animal health products, energy, water, farm structures, trucks, and a host of other goods and services purchased by farmers. This presentation will focus on the situation and outlook for planted acreage, seeds, and the major manufactured agricultural inputs. Information on feed and livestock inputs is being presented in other Outlook sessions. In closing I'll briefly review several of the trends and issues affecting agricultural inputs in the near term.

The largest category (28 percent) of agricultural production expenses have a farm origin and include expenditures for livestock, feed, and seed (fig. 1). Expenditures for these inputs are largely influenced by livestock and grain prices. Overhead expenses (depreciation, taxes, and rent) make up about 22 percent of all production costs, and by definition, are not directly linked to agricultural production levels. However, most of the remaining expense categories are correlated with acreage planted and farm output. Operating expenses such as repairs, machine hire, and marketing costs (16 percent); interest (12 percent); and labor (8 percent) are other major production cost categories. Manufactured inputs (fertilizer, pesticides and energy) account for 14 percent of all production expenses. The distribution of production expenses across major categories has remained fairly constant during the last several years.

Acres Planted

Nondurable agricultural input use is highly dependent on the mix and level of crop acres planted. Per acre seeding rates, application rates for fertilizer and pesticides, and tillage practices tend to change slowly from year-to-year leaving acres planted the major determinant of consumption. Small changes in commodity and input prices appear to have only a limited influence on aggregate input consumption. However, some evidence suggests that large changes in input prices, such as the energy price shocks of the 1970's and interest rate jumps of the 1980's, lead to rapid changes in input use.

Planted acreage of the principal crops grew steadily during the 1970's, peaked in 1981, fell dramatically in the PIK-year of 1983, bounced back in 1984 and declined through 1988.^{1/} Due to heavy participation in the commodity programs and the Conservation Reserve Program (CRP), planted acreage in 1987 and 1988 was the lowest in nearly 16 years (excluding 1983). Much of the planted acreage variation in the 1980's was due to the input intensive row crops (fig. 2). The less intensively farmed solid seeded (i.e. small grains) crop acreage (which is dominated by harvested winter wheat acreage) showed only modest changes between 1980 and 1989, while hay acreage was nearly constant. Planted acreage of the principal crops increased in 1989 to 325 million acres and is expected to increase to about 328-330 million in 1990.

The acreage reduction programs (ARP) for 1990 feed grains are similar to 1989, while wheat and cotton ARP's have declined. The net effect, even with some limited flexibility in planting non-program crops on base acreage, will likely be an increase in row crop acreage and a slight increase in harvested solid seeded crops, especially winter wheat.

Seed Consumption

In 1989, seed consumption of the eight major field crops was close to 6.4 million tons, down 11 percent from the record acreage year of 1981 when 7.2 million tons were planted (fig. 3). Seeding rates in 1989 for the major crops were similar to 1988, but seed costs per acre were above year earlier levels due to rising seed costs (table 1). For 1990, seed use will likely rise about 4 percent over 1989 due to modest increases in planted acreage of the major field crops.

The combination of greater planted acreage, reduced seed supply, increased commodity prices and more expensive off-season production led to some significant seed price increases in 1989. For example, soybean and hybrid corn seed prices rose about 24 percent and 11 percent, respectively, between 1988 and 1989. Forage seed prices also rose in 1989 as Conservation Reserve

^{1/} Principal row crops include planted area of corn, sorghum, soybeans, flaxseed, peanuts, sunflowers, cotton, dry edible beans, potatoes, sweet potatoes, and sugarbeets, and harvested area of tobacco and sugarcane. Principal solid seeded crops include planted area of oats, barley, durum and other spring wheat, rice and harvested area of winter wheat and rye. All hay area is for harvested acreage only.

Program (CRP) acres continued to increase. USDA's prices paid index for seeds rose 10 percent in 1989 and is likely to increase only 3 to 5 percent in 1990 as the growth in corn and CRP acreage slows and commodity prices weaken (fig. 4). Seed prices for non-hybrid crops tend to follow commercial crop prices.

Fertilizer Consumption

Fertilizer nutrient consumption stood at 19.5 million tons for the 1988 fertilizer year, only slightly less than the forecast 1989 consumption of near 20 million (fig. 5). Fertilizer use in 1990 should be near 20.6 million tons, up 3 to 4 percent from last year.

Our 1989 application rate survey indicates decreased fertilizer use on all the major crops of corn, soybeans, cotton, and wheat (table 2). In the case of corn, the major consumer of fertilizer nutrients, application rates for nitrogen, phosphate and potash fell by 4, 6, and 5 percent, respectively. Fertilizer carryover from the drought stunted crop in 1988 as well as an increase in fertilizer prices in the spring of 1989 may have contributed to the application rate declines. For all crops, the proportion of acreage fertilized was similar to 1988.

With modest increases in demand projected for 1990, increased fertilizer stocks and no significant surge in foreign demand, prices for 1990 will likely be similar to 1989 levels (fig. 6). Fertilizer prices between 1983 and 1987 were well below the peak use years of 1981 and 1982 due to falling demand and lower energy costs. Nominal prices in 1990 will likely remain below 1981/82 levels.

Pesticide Use

Estimates for pesticide use on the 10 major field crops also closely follow planted acreage with herbicides accounting for an estimated 80 percent of all active ingredients, insecticides about 15 percent, and fungicides and other compounds the remainder.^{2/} The herbicide market for the major crops of corn, cotton and soybeans is very mature. In 1988, 95 percent of the corn, soybean, and cotton acreages were treated with herbicides--unchanged from 1987.

Consumption of pesticides on the major field crops is estimated at around 400-450 million pounds of active ingredients (a.i.) with year-to-year variations due to shifts in planted acreage (fig. 7). Since corn, soybeans, and cotton account for the largest portion of pesticide use, changes in these crop acres will significantly affect aggregate pesticide use. Hence with the corn and cotton acreage anticipated to increase slightly next year pesticide consumption is expected to rise between 4 and 7 million pounds, which is 1 to 2 percent over estimated 1989 levels. As new products, which require very small amounts of a.i. per acre, are more widely adopted, aggregate pesticide poundage may actually decline even though acres treated remain stable or even increase.

^{2/} The 10 major field crops are wheat, barley, oats, rice, corn, cotton, grain sorghum, peanuts, soybeans, and tobacco.

Pesticide prices, as measured by USDA's prices paid index for agricultural chemicals, trended downward between 1984 and 1987 (fig. 8). The price index increased slightly in 1988 and 1989 and is expected to rise further as corn and wheat acreage increases in 1990. A 2 to 4 percent increase in prices would bring the prices paid index up to the level recorded in 1984.

Capital Purchases

Capital expenditures by farmers between 1980 and 1986 fell by nearly 60 percent. Rising real interest rates, declining commodity prices, curtailed agricultural exports, reluctance to take on additional debt, falling land values, reduced planted cropland, and a binge of capital spending in the 1970's led to very conservative levels of capital spending in the 1980's. Tractors and other farm machinery typically make up about 60 percent of all capital expenditures with buildings and land improvements accounting for about 25-30 percent and cars and trucks accounting for the remaining 10-15 percent. Large new tractor purchases have been one of the hardest hit categories with unit sales off 75 percent between 1980 and 1986 (fig. 9).

1986 was the end of a seven year slump for the farm machinery industry. Unit sales of new farm tractors and other large pieces of farm equipment increased in 1987 and 1988 and are likely to show further gains in 1989 and 1990. Sales of new over 40 hp tractors may reach 64 thousand units, up from an estimated 62 thousand in 1989. Combines did not substantially rebound until this year due to the 1988 drought, which led some farmer's to postpone capital expenditures. Self-propelled combine sales, which are closely linked to harvest prospects, began to rise significantly above 1988 levels in April of this year (fig. 10).

With the outlook for net farm cash income to rise in 1990, agricultural interest rates to remain near year-end 1989 levels, and the agricultural sector's debt/asset ratio to stabilize, 1990 capital expenditures are expected to surpass those of 1989 by 4 to 5 percent. Prospects for increased planted acreage and an aging farm machinery stock may also positively influence capital spending by farmers. Furthermore, 1990 will likely be the sixth consecutive year in which net cash income will be near or greater than \$50 billion, which should facilitate greater capital expenditures.

Petroleum Products

Consumption of petroleum products by agricultural producers has been steadily declining since 1978 regardless of planted acreage levels (fig. 11). While acres planted obviously influence energy use, other factors are also important. The switch from gasoline to diesel engines, reduced tillage operations, larger multi-function machines, and innovations in crop drying and irrigation have contributed to the decline in fuel consumption. While no-till farming has not been widely adopted, reduced tillage systems are now as prevalent as conventional tillage systems (i.e., including the use of a moldboard plow) in many parts of the country. With only a modest increase in planted acreage forecast for 1990, energy use will likely remain near the forecast levels for 1989.

Just as petroleum consumption in agriculture has been falling, petroleum prices have dropped almost continuously between 1981 and 1986 (fig. 12). Crude oil prices have stabilized since 1986. It is clear that crude oil prices dictate the price farmer's pay for diesel fuel. As of November 1989, DOE was forecasting 1990 crude oil and diesel fuel prices to remain flat, but unpredictable geopolitical forces will likely shape the final 1990 petroleum price structure. Since agriculture directly consumes only 3-4 percent of all energy used in the U.S., changes in the farm sector's usage will have little impact on petroleum prices.

Trends and Issues Shaping Agricultural Input Consumption and Production

- Farms with over \$250,000 in sales constitute less than 5 percent of all farms, but produce over 55 percent of all cash receipts. At the same time these farms are responsible for nearly 50 percent of all cash expenses. Input distribution, technology adoption, and perhaps, agricultural productivity will be affected by the smaller number, but larger sized farms.
- While increased concentration in the farm sector is continuing, the trend is even more pronounced in the input industries. Major changes in the industrial organization of the farm machinery, fertilizer, agricultural, chemical, seed, and credit industries have occurred in the last five years. As these input industries have become concentrated they have taken on an international flavor. Agricultural input companies headquartered in Western Europe, Japan, and North America dominate the global input markets.
- Biotechnology research in both the private and public sector promises to transform or replace conventional inputs. Just as the mechanical, chemical, and computer technologies of the past changed input type, mix and intensity, livestock and crop genetic manipulation will do the same in the future. The established seed and chemical industries as well as the newer biotech firms, appear poised to bring a number of genetically engineered products to the market in the next few years.
- Farm programs will continue to exert influence on acres planted, commodity prices, and farm income. The 1985 Food Security Act was innovative in several respects regarding soil conservation issues. The CRP and the conservation compliance provisions of the 1985 Act are designed to protect highly erodible lands. Both these measures affect input use either through a reduction of acres planted, by mandating a change in tillage practices to leave additional residue on the soil, or encouraging a shift in crop rotation patterns.
- Changes were recently made in the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) regarding pesticide testing or retesting for possible health risks. These tests will be costly and if the costs are passed onto farmers, pesticide prices will rise. More changes are being proposed for both FIFRA and the Federal Food, Drug and Cosmetic Act (FFDCA). Pesticide availability and use may also be affected by such issues as patent extension, groundwater contamination, liability issues, farm worker safety, and residues on food. The outcome of the Endangered

Species Act may also influence pesticide usage patterns.

- Groundwater issues also may infringe upon the fertilizer industry especially in areas where nitrates have been detected in drinking water. A number of states have passed or proposed legislation aimed at protecting the drinking water of its citizens. The 1987 Water Quality Act promotes the concept of "best management practices" as a way of maximizing the benefit from using fertilizers yet minimizing the environmental side-effects on surface and ground water.
- While the ongoing GATT negotiations are currently emphasizing agricultural commodity issues, these talks have implications for agricultural inputs. Worldwide shifts in agricultural production in response to changing trade patterns will affect the current mix, intensity, and location of input consumption and resource use. Furthermore, the current round of negotiations will also consider proprietary rights; an issue with implications for technology development and transfer for biotechnology, seeds, pesticides, and other R&D intensive inputs.
- Low input sustainable agriculture is currently an important issue within parts of the agricultural research community. Primarily in response to water quality and food safety problems, new technology development as well as reevaluation of traditional production practices are being encouraged. The substitution of land, labor or management for conventional inputs such as fertilizer and pesticides and the further adoption of reduced tillage systems are proposed as ways to reduce costs of production. At the very least this program should alert farmers to the adverse environmental and economic consequences of input overuse.

Table 1--Seeding rate and cost for selected crops in major producing States, 1989
(Preliminary)

Crop/ State	Acres planted	Per acre		:	Crop/ State	Acres harvested	Per acre	
		Rate	Cost				Rate	Cost
				:				
Corn for grain	Thous.	Kernels	Dollars	:	Winter wheat	Thous.	Pounds	Dollars
IL	10,900	24,900	20.62	:	AR	1,350	128	13.92
IN	5,500	24,500	20.09	:	CA	570	134	15.11
IA	12,700	23,900	20.93	:	CO	2,100	44	3.63
MI	2,300	23,900	20.35	:	ID	810	86	9.78
MN	6,200	26,000	22.72	:	IL	1,800	105	14.72
MO	2,400	21,400	18.37	:	IN	880	117	16.86
NE	7,500	24,400	20.88	:	KS	9,600	61	6.56
OH	3,300	26,000	22.12	:	MO	1,850	112	12.94
SD	3,400	17,900	14.36	:	MT	1,700	56	4.91
WI	3,600	24,000	17.71	:	NE	2,050	63	6.04
Area	57,800	24,100	20.33	:	OH	1,200	136	18.16
Soybeans		Pounds	Dollars	:	OK	5,700	75	7.04
				:	OR	800	79	9.64
AR	3,500	54	10.91	:	TX	3,000	73	7.91
GA	1,200	45	9.56	:	WA	1,300	66	8.12
IL	8,800	77	19.48	:	Area	34,710	77	9.59
IN	4,600	59	14.43	:	Spring Wheat			
IA	8,300	61	15.66	:	ID	580	101	13.72
KY	1,200	60	13.90	:	MN	2,600	108	11.44
LA	1,950	54	14.53	:	MT	3,500	63	5.73
MN	5,050	67	14.34	:	ND	7,700	92	8.37
MS	2,500	55	11.84	:	SD	2,200	88	7.97
MO	4,400	59	13.52	:	Area	16,580	88	8.82
NE	2,600	61	15.79	:	Durum wheat			
NC	1,550	59	13.88	:	ND	3,000	99	10.13
OH	4,000	75	18.14	:				
TN	1,480	50	10.44	:				
Area	51,130	63	15.26	:				
Cotton				:				
AZ	460	15	8.27	:				
AR	590	14	7.08	:				
CA	1,069	17	10.99	:				
IA	650	13	7.33	:				
MS	1,100	13	7.32	:				
TX	4,575	19	8.12	:				
Area	8,444	18	8.21	:				
				:				

This table and the succeeding table contain preliminary 1989 information. Final tables on seed, fertilizer, pesticide and tillage use during 1989 and additional data will be published in "Agricultural Resources--Inputs Situation and Outlook Report" to be issued in February, 1990.

Table 2--Fertilizer use on selected crops in the major producing States, 1989 (preliminary)

		Acres receiving			Application rate					Acres receiving			Application rate		
State	Acres 1/	N	P2O5	K2O	N	P2O5	K2O	State	Acres 1/	N	P2O5	K2O	N	P2O5	K2O
	Thousand	Percent			Pounds per acre				Thousand	Percent			Pounds per acre		
Corn for grain								Cotton							
IL	10,900	99	83	85	160	74	101	AZ	460	95	51	3	178	64	*
IN	5,500	99	94	87	133	78	110	AR	590	94	70	71	80	35	62
IA	12,700	99	85	83	128	57	69	CA	1,069	97	42	13	123	56	14
MI	2,300	99	94	90	111	52	105	LA	650	100	70	72	86	45	55
MN	6,200	97	89	85	115	49	63	MS	1,100	100	54	61	103	49	65
MO	2,400	97	79	82	140	58	72	TX	4,575	63	53	22	48	37	12
NE	7,500	96	68	28	145	36	23	6 State Total	8,444	79	54	32	83	43	40
OH	3,300	99	97	92	143	72	101								
SD	3,400	69	58	30	69	33	23								
WI	3,600	99	95	95	88	55	73								
10 State Total	57,800	97	84	75	131	59	81	AR	1,350	97	38	38	99	45	54
Soybeans								CA	570	92	36	6	105	43	*
								CO	2,100	64	13	nr	45	32	nr
								ID	1,390	90	47	7	95	41	32
								IL	1,800	98	78	66	90	72	79
AR	3,500	11	27	29	16	37	57	IN	880	95	89	88	76	63	65
GA	1,200	67	77	78	20	40	76	KS	9,600	87	52	6	53	32	29
IL	8,800	10	23	33	17	54	85	MN	2,600	99	89	65	72	37	28
IN	4,600	20	31	41	12	48	81	MO	1,850	96	76	70	86	54	67
IA	8,300	9	16	18	16	50	68	MT	5,200	59	52	10	34	26	12
KY	1,200	35	54	55	24	63	76	NE	2,050	76	13	nr	41	30	nr
LA	1,950	7	36	37	24	41	60	ND	10,700	73	61	9	41	28	19
MN	5,050	16	17	16	16	34	51	OH	1,200	95	92	90	79	60	67
MS	2,500	10	34	34	16	42	63	OK	5,700	95	59	12	75	36	22
MO	4,400	11	20	23	25	41	69	OR	800	97	12	6	75	44	38
NE	2,600	24	28	13	16	36	23	SD	2,200	44	35	6	54	28	*
NC	1,550	54	55	63	24	40	80	TX	3,000	72	32	8	89	41	26
OH	4,000	21	37	50	14	55	93	WA	1,300	98	41	2	66	30	*
TN	1,480	22	45	51	21	43	61	18 State Total	54,290	81	53	18	62	37	46

* -- insufficient data nr = none reported

1/ Acres are harvested for winter wheat and planted for all other crops.

2/ Does not include winter wheat in MN, MO, and SD; spring wheat in CA, CO, and WA; and durum wheat in MN, MT, and SD.

Figure 1
Distribution of Production
Expenses, 1988

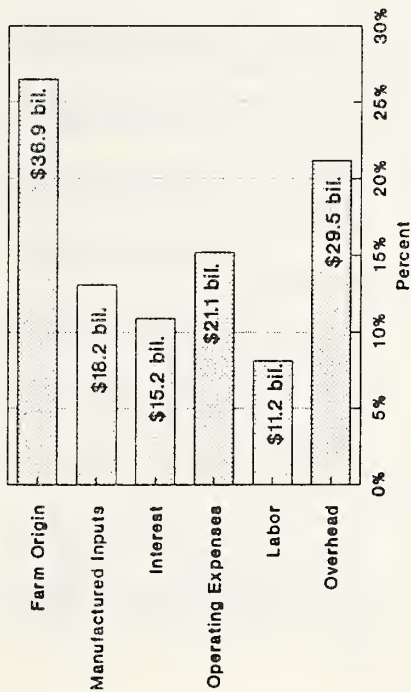


Figure 2
Area Planted to Principal Crops

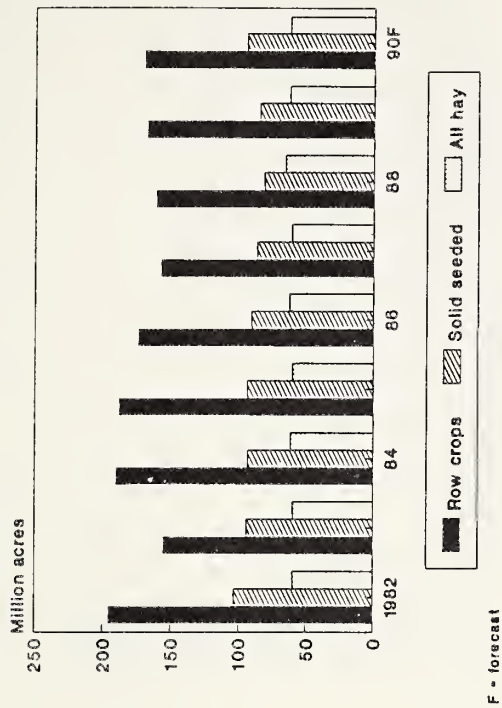


Figure 3
Seed Use for Major Crops

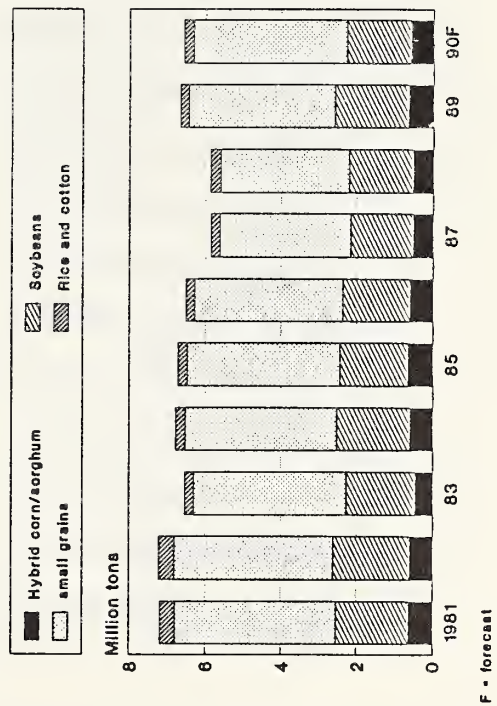


Figure 4
Seed Price Index

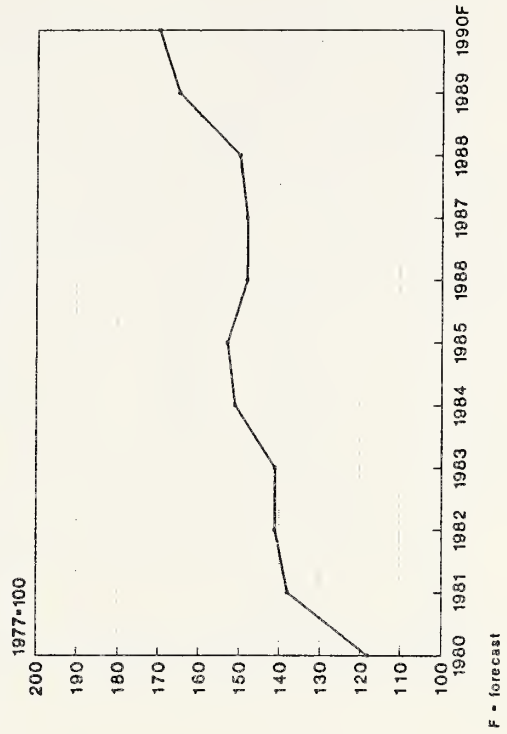


Figure 6 Fertilizer Nutrient Consumption

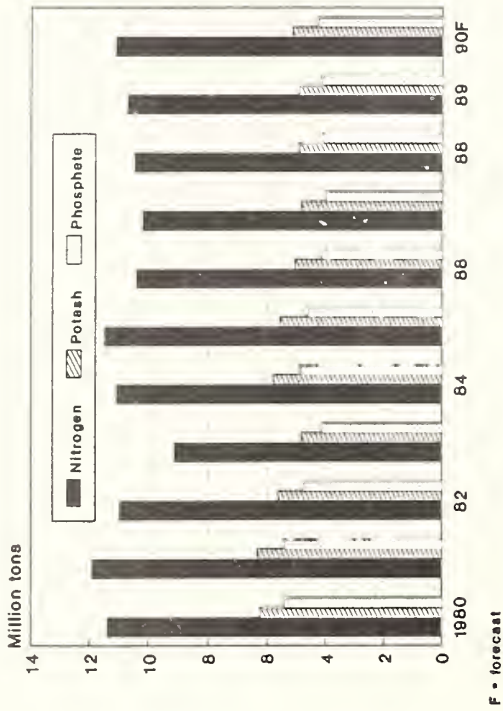


Figure 6 Fertilizer Price Index



Figure 7 Pesticide Use on Major Field Crops

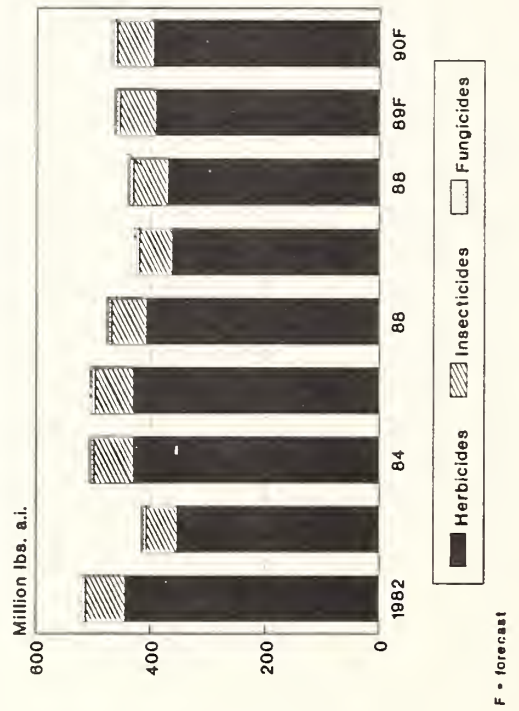


Figure 8 Agricultural Chemical Price Index



Figure 9 Tractor Unit Sales

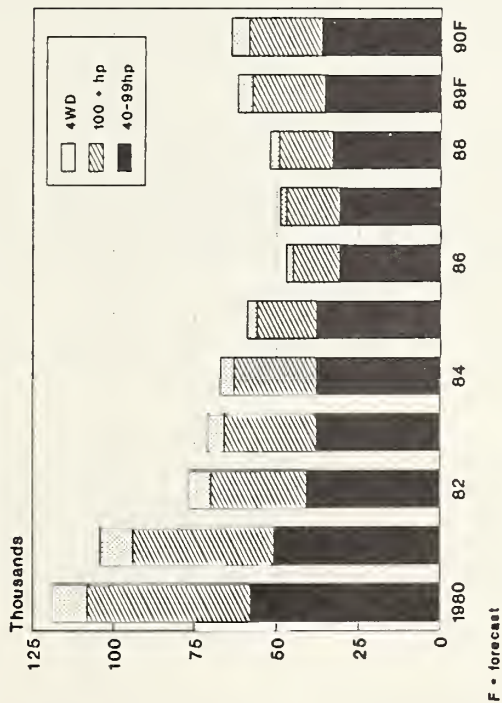


Figure 10 Sales of Self-Propelled Combines

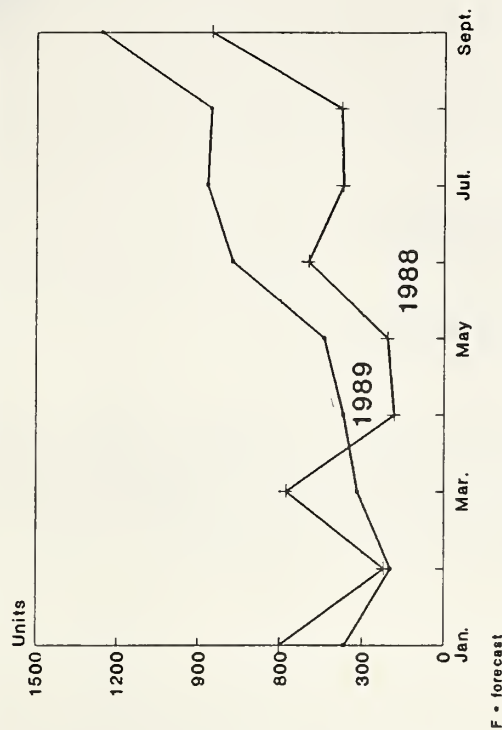


Figure 11 Farm Fuel Use

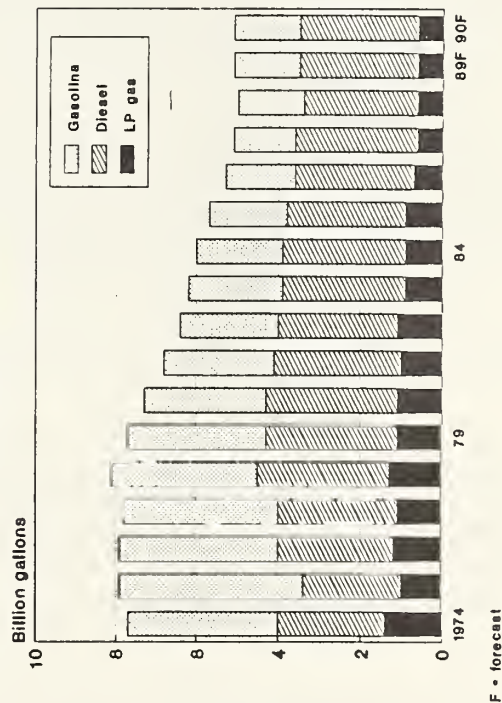
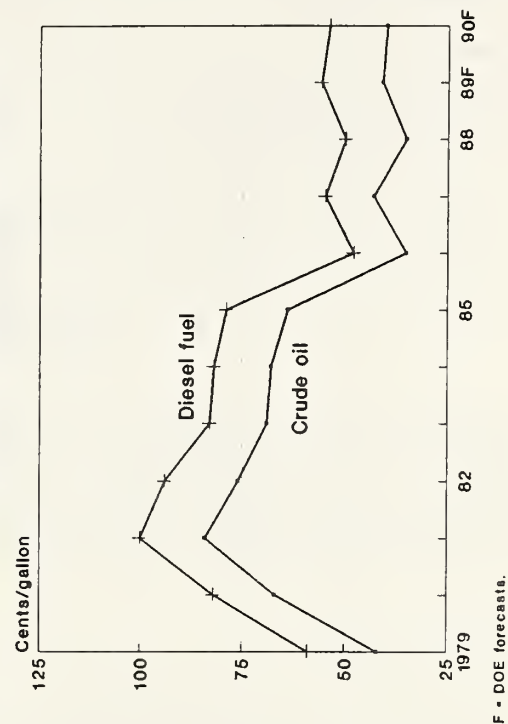


Figure 12 Crude Oil and Diesel Fuel Prices



ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.



Outlook '90, Session #22

For Release: Thursday, November 30, 1989

OUTLOOK FOR DAIRY

James J. Miller
Agricultural Economist,
Economic Research Service

The events of 1989 are a reminder that market prices are not always determined solely by the amount produced and demand conditions. Fundamentally, 1989 and 1988 were not much different. The particular sequence of industry decisions and events in 1989 turned what might have been only a moderately tight market into a chaotic market with record prices.

Commercial Use

Strong domestic cheese demand and export demand for nonfat dry milk tightened markets and were the most important fundamental force generating higher prices in both 1988 and 1989. However, demand strength has not been consistent in 1989. Demand for fluid milk was fairly strong, but demand for butter and perishable manufactured products was weak.

During January-September, commercial use of cheese rose 5 percent from a year earlier. Although retail cheese prices were not as favorable as in recent years, continued economic growth and the earlier end to direct cheese donations boosted commercial use. Late-1989 use is unlikely to post large increases. Sharply rising prices have had to ration available supplies.

Fluid milk sales have run 1-2 percent above a year earlier, after the small 1988 rise. However, sales of frozen products and cottage cheese fell.

Commercial use of butter fell sharply during the first half of 1989, almost the sole cause of declines in the milk equivalent (milkfat basis) total of all dairy products. Even though butter sales may recover during the last half, earlier declines and the lack of cheese supplies may hold the 1989 milk equivalent total slightly below 1988, the first dip since 1980.

In 1990, the late-1989 price jumps may slow growth in fluid and cheese sales, partially offsetting the effects of a still strong economy. Prospects for

some recovery in sales of cream-based products are reasonably good. The support price for butter will be sharply lower after January 1 because of forthcoming realignments in support prices and last July's cut. The 1990 total commercial use may rise 1-3 percent from this year.

Commercial use of nonfat dry milk was very strong in 1989, mostly because of the 350-400 million pounds likely to have been exported. After prices declined to quite favorable levels during the first quarter, export traders obtained very large commitments for exports through the end of 1989. These commitments, along with low commercial stocks of American cheese, made the dairy industry very vulnerable to any slowing in milk production. Next year's commercial use of nonfat dry milk will be smaller because of smaller exports.

Despite continued relatively high expected prices in international markets, U.S. exports of nonfat dry milk will fall in 1990. Commercial use of cheese and fluid milk will keep skim solids fairly tight domestically. Also, nonfat dry milk makers are not likely to overcommit to the export market for a second year. Even so, export demand is expected to continue as an important price factor, unless international prices run below the support purchase price.

Milk Production

Milk production started 1989 strong, posting a 2-percent rise from a year earlier in spite of continued cost pressures from the 1988 drought. Relatively low milk-feed price ratios forestalled normal increases in concentrate feeding. However, the high quality of last year's forage and extra attention to feeding programs were enough to sustain fairly large increases in milk per cow, easily outweighing declines in milk cows of just over 1 percent.

Milk per cow collapsed during spring, as supplies of dairy quality forage were exhausted and hay crops were delayed by cool weather. Output per cow has been below a year ago since July, evidence of substantial damage from feed problems. Except for unusual patterns caused by the Milk Diversion Program, this was only the second period of year-to-year declines in milk per cow since World War II.

Dips in milk per cow and continued trimming of cow numbers by high slaughter kept July-October milk output 1 or 2 percent below a year ago. Very high milk prices and slipping feed prices created ample incentive to expand output this autumn. If production starts to respond, the 1989 total may be just slightly under 1988's 145.5 billion pounds.

Production Outlook

Feedgrain and protein meal prices will be lower in 1990, causing ration values to slip as the year progresses. Although the spread probably will widen

between ingredient values and ration values, average ration values may fall 10-15 percent in 1990.

During the first half of 1990, milk prices will fall faster than feed prices. The current quite favorable milk-feed price ratio and returns over concentrate costs will be substantially eroded by spring. During the rest of 1990, milk-feed price relationships probably will be no better than moderately favorable.

Like the July 1 inventory, the January 1 reading probably will show a large herd of dairy replacements. Large numbers of heifers entering the herd may be offset by continued high slaughter of milk cows. Slaughter cow prices are expected to stay strong in 1990.

Forage quality and the extent of mid-1989 damage to milk per cow remain key uncertainties for early 1990 production. If current incentives can generate upward momentum, milk production probably will expand during most of 1990. For the year, milk production likely will grow 1-3 percent.

Stocks

Commercial stocks followed the same general pattern throughout 1989. While butter holdings were ample, commercial stocks of American cheese stayed low, and manufacturers' stocks of nonfat dry milk were small relative to commercial use. After their 1988 experience, cheese traders probably intended to build larger stocks last spring, but waited too long to start.

The only significant Government stocks have been of butter. On November 1, Government holdings were up by half from a year ago and the largest on that date since 1984.

Government Purchases

High farm fat tests, milk going into butter-nonfat dry milk production because of powder demand, and weak sales of cream-based products kept Government purchases of butter large through mid July. Small sales back to the industry were made in late July and August, before small purchases resumed in September. For all of 1989, net removals of butter will exceed 400 million pounds for the first time since 1983.

Domestic market use of skim solids in 1989 also fell considerably short of production. However, the international market was willing to absorb even more than our domestic excess, leaving no nonfat dry milk and very little cheese to be sold to the Government.

Purchases for all of 1989 probably will total close to 1988's 8.9 billion pounds (milk equivalent, milkfat basis), even though second-half removals will have been modest by the standards of the eighties. Removals in 1990 are expected to decline slightly. However, butter purchases are likely to remain large.

Farm and Wholesale Prices

By midyear, the pattern of prices during the second half of 1989 had already been set. Export commitments and stocking decisions had made it impossible to easily absorb any slowing in output, causing a scramble for supplies and soaring prices when milk production then declined. Prices had to rise enough to ration shortened domestic supplies. Even then, supplies were not adequate to maintain normal product flow.

This autumn's record cheese and nonfat dry milk prices brought farm milk prices to records also. The Minnesota-Wisconsin price of manufacturing grade milk will hit a peak of more than \$14 per cwt, up \$2 from a year ago and \$3 above the March low. Sharp second-half rises will leave the 1989 average price of all milk more than \$1 per cwt higher than 1988's \$12.24.

Sharp decreases in wholesale prices of nonfat dry milk and cheese probably will start about yearend. In addition to the normal seasonal production expansion and demand decrease, milk output probably will be recovering and most export commitments will have ended. Rebuilding pipeline and warehouse stocks will absorb significant amounts of milk. Even so, prices must fall drastically to reach levels supported by expected output, commercial use, and international prices. By late spring, farm milk prices may be below a year earlier.

Markets are likely to be tight enough to trigger a significant seasonal rise during the second half of 1990--but nothing like this year's. In fact, merchandisers may overcompensate and be too cautious about stocks and export sales, limiting late-1990 price increases. For the year, 1990 milk prices may not be much above 1988.

Retail Dairy Prices

In early 1989, retail dairy prices were slow to reflect declines in farm and wholesale prices. Retailers may have been cautious because of early signs that prices would soon be rising. Retail dairy prices also were slow to follow the early wholesale and farm price increases. However, late-1989 rises in retail prices have been rapid. The annual average probably will increase 6 percent from 1988, the sharpest rise since 1981 and slightly outpacing rises in indices of prices of all food and of all consumer items.

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
Washington, D.C.



Outlook '90, Session 22

For Release: Thursday, November 30, 1989

1990 MIDWEST OUTLOOK LOOK AT THE PAST TO SEE THE FUTURE

Michael J. McDonald
Chicago Regional Agricultural Economist
USDA/AMS/Dairy Division

Wouldn't it be exciting to travel into the future in the Robert Zemeckis time machine (Delorean) used in the popular movie *Back to the Future* and its sequel which has just been released, *Back to the Future Part II*.

As in the movie, I would be able to program any time and date into the time machine. The date I would choose is March 5, 1991, at noon. I would be able to tell you with certainty 1990's milk production, commercial disappearance, government purchases, farm and wholesale prices, retail dairy prices and the elusive Minnesota-Wisconsin Price.

Mr. Miller has just given his dairy outlook into 1990 without the help of a time machine. I, too, have taken on this task, without the use of Hollywood's time machine and special effects, of looking into the future.

Mr. Miller and I had to look at the past to see the future. Mr. Miller viewed the national outlook and I will be more specific and address the Midwest regional outlook.

Figure 1 shows Milk Production (Supply) and Commercial Disappearance (Demand) from 1976 to 1990. The years 1989 and 1990 are estimated. This figure graphically shows the supply vs. demand for milk produced in the nation.

In 1983, milk production was 139.7 billion pounds and commercial disappearance was 122.6 billion pounds. The United States had a 17.1 billion pound surplus of milk. The supply vs. demand for milk has become closer in recent years. There was an 8 billion pound milk surplus in 1988. There is a projected 5.5 billion pound surplus in 1989 and a projected 7.5 billion pound surplus in 1990.

Let's look at the milk production of the United States divided into 5 regions. The regions are Northeast, Southeast, Midwest, Southwest and West (see Figure 2).

The Northeast region represented 21% of the milk produced in the United States in 1983. This percentage is estimated to decrease to 20% and 19% in 1989

and 1990, respectively. This decrease is primarily due to the fact that less milk is being produced in New York and Pennsylvania.

The next region, the Southeast, represented 10% of the milk produced in the United States in 1983. This percentage is estimated to decrease to 9% in 1989 and 1990. Thus far, this region has shown production increases in 1989 over 1988 but not enough to change its percentage when compared to the United States.

The third region, the Midwest, represented 45% of the milk produced in 1983. This percentage is estimated to decrease to 43% in 1989 and 1990. The decrease in 1989 is due to the fact that less milk was produced in Minnesota and Wisconsin than in 1988. The percentage should remain the same in 1990, even though Minnesota and Wisconsin will expand production, because of the expanded production throughout the United States.

The fourth region, the Southwest, represented 6% of the milk produced in 1983. This percentage is estimated to increase to 7% and 8% in 1989 and 1990, respectively. The increase in this region is primarily due to the expansion of milk production in Texas.

The final region, the West, represented 18% of the milk produced in 1983. This percentage is estimated to increase to 21% in 1989 and 1990. The increase in this region is primarily due to the continued expansion of milk production in California and Washington.

The Top 5 milk producing states in the United States for 1988 were as follows:

- 1) Wisconsin - 17%
- 2) California - 13%
- 3) New York - 8%
- 4) Minnesota - 7%
- 5) Pennsylvania - 7%

The other 5 states in the Top 10 were:

- 6) Michigan - 4%
- 7) Texas - 3%
- 8) Ohio - 3%
- 9) Washington - 3%
- 10) Iowa - 3%

The other 40 states production was the remaining 32% of the milk produced in 1988.

The two periods of time that we have to look at are 1988 and the first three quarters of 1989. The two states that we are going to look at in this time period are Minnesota and Wisconsin. This period in history will probably be referred to as "The Drought of 1988" and "The Aftereffects of the Drought in 1989".

The Drought of 1988

In Wisconsin, the drought had a very real affect on the crops and the land. The crops were small, stressed and very few. The fields looked cracked, brown and dry. The drought occurred at an important time as far as dairy production was concerned. In this region, the flush (the largest milk production period) begins in May and lasts until June or July. This also is a very good time for the manufacturing sector of the dairy industry to replenish their warehouses and pipelines of dairy products, mainly powder and cheese. Normally, the scene in the 70's and 80's has been that the manufacturing sector sold cheese to the government in the form of CCC purchases in the early part of spring and bought back these dairy products in the fall.

In 1988, the industry sold a very small amount of cheese to the government, so that the government could not sell any of this cheese back to the dairy industry. This situation had many cheese buyers looking for product for their holiday sales. This uncertainty of product availability caused the price for 40-pound block cheese on the National Cheese Exchange to increase from \$1.14 a pound in June to \$1.3125 a pound by December. This 17.25 cents per pound increase in the National Cheese Exchange price resulted in a \$1.94 increase in the Minnesota-Wisconsin Price for the same period.

Wisconsin was experiencing increases in milk production in 1988 over 1987 in every month except June and December. In 1988, the number of cows declined by an average of 32,000 when compared to the same months in 1987. Milk production per cow increased every month in 1988 compared to 1987.

Minnesota experienced a different picture in 1988. Minnesota showed decreases in production in seven months and increases in the other five months (January, February, March, September and October) over 1987. Minnesota monthly cow numbers declined an average of 21,000 cows in 1988 compared to 1987. Milk production per cow increased every month in 1988 over 1987 except for the months of May and June.

Aftereffects of the Drought in 1989

Minnesota-Wisconsin (M-W) Price

Beginning in January 1989, the cheese market price fell rapidly to \$1.14 a pound by the end of the month. This 17.25 cents per pound decrease resulted in a \$1.29 decline in the M-W price by April 1989.

At the beginning of May, the National Green Bay Cheese Exchange price for 40-pound block cheese was \$1.19 a pound. Within six months, this cheese price increased to its present level of \$1.5450 a pound. This was a 35.50 cents per pound increase in the cheese price. Some experts, rather than use just the cheese exchange price, also use the Wisconsin Assembly Point price for cheese. This price

is graphically shown in figure 3, "Cheese, Butter, Powder Prices". This graph shows the change in the price of cheese (Wisconsin Assembly Point), butter (Chicago Wholesale) and powder (Chicago Grade A) for 1988 and 1989.

Figure 3 shows the dramatic increase in the cheese and powder prices that we have been experiencing since the spring of 1989.

Figure 4, "Minnesota-Wisconsin Price - Support Price", graphically illustrates the affect these dramatic price increases had on the Minnesota-Wisconsin Price. This chart shows a four-year history of the M-W price compared to the Support Price in effect during this time period. This chart graphically shows the rapid price increases in 1988, the 1989 spring price decline and the dramatic record-breaking M-W price increases in the remainder of 1989. Since the announcement of April's M-W price of \$10.98, this price has increased \$2.89 to its present record price of \$13.87 for October 1989.

Figure 5 shows a futuristic look, without the use of a time machine, at the M-W price for November 1989 through June 1990. These prices are my estimates.

Estimated M-W Prices

November 1989	\$14.35
December 1989	\$14.45
January 1990	\$14.05
February 1990	\$13.35
March 1990	\$12.65
April 1990	\$12.10
May 1990	\$11.50
June 1990	\$11.00

Minnesota-Wisconsin Situation

These two states' milk production was affected more by the drought in 1989 than in 1988. There was less feed and because the older cows were culled in 1988, the remaining cows in the herds were much younger. Therefore, these cows, with less quality feed, did not produce as much milk because of their lack of maturity. These two states experienced a continued loss in the number of cows, on the average between 25,000 and 38,000 of milk cows when compared to the same months in 1988. This fact is shown in figures 6 and 7.

Milk production per cow varies differently in Minnesota and Wisconsin for this time period.

Figure 8 shows that Minnesota's milk production per cow increased or stayed the same in all months when compared to 1988. Only February showed a decrease from a year ago.

Figure 9 shows that Wisconsin's milk production per cow followed the same pattern as Minnesota in the first five months of 1989. The last five months, June through October, have shown decreases in milk production per cow when compared to 1988.

Cheese Situation

Summarizing the cheese situation that occurred in the first two-thirds of 1989 compared to 1988, we see:

- 1) Production increased 38.3 million pounds or a 1% increase.
- 2) Stocks were down 73.5 million pounds or a 14.8% decrease.
- 3) Commercial disappearance increased 197.6 million pounds or a 5% increase.

This exemplifies the statement made by Mr. Miller that "strong domestic cheese demand" has been one of the most important forces generating higher prices. I concur with this statement.

Powder Situation

Summarizing the powder situation that occurred in the first two-thirds of 1989 compared to 1988, we see.

- 1) Production was down 82 million pounds or a 10% decrease.
- 2) Stocks were down 35.9 million pounds or a 38.6% decrease.
- 3) Commercial Disappearance gained 174.7 million pounds or a 36.6% increase.

Figure 10 shows that the milk production in Minnesota has decreased in every month except for slight increases in January and June when compared to 1988's milk production. Figure 11 shows that milk production in Wisconsin has decreased in all months when compared to 1988's milk production.

Figure 12 shows the 21-state milk production, 1989 vs. 1988. This figure shows, as Mr. Miller stated, that milk production increased in 1989 in the first 5 months for this 21-state total. However, this 21-state total has been showing decreases in the last 5 months (June through October 1989). The overall effect has been a slight .2% decrease in production from 1988 level.

To summarize, Milk Production-First Three Quarters of 1989 vs. First Three Quarters of 1988, we see:

- 1) United States showed an increase of 56 million pounds or a .05% increase.
- 2) Minnesota-Wisconsin produced 757 million pounds less or a 2.8% decrease.
- 3) The Minnesota-Wisconsin reduction is the equivalent of:
 - a) 76.5 million pounds of cheese or
 - b) 61.5 million pounds of powder

These estimates are based on converting this lost milk production to cheese and powder using the Support Price yields of 10.1 pounds of cheese per hundred pounds of milk and 8.13 pounds of powder per hundred pounds of milk, respectively.

1990 Midwest Outlook Summary

My 1990 Midwest Outlook Summary is as follows:

- 1) M-W price will fall rapidly, in 50-70 cents increments, to \$11.00 by June. In the fall, the seasonal rise in price will push the M-W price up to \$12.50.
- 2) National Cheese Exchange Cheese prices will fall rapidly in January and February and will increase in the fall.
- 3) Milk Production will expand in Minnesota and Wisconsin 3-5% over 1989, but it will not reach 1988's level of production.

I hope you enjoyed looking at the past to see the future even though I didn't use a Delorean time machine to see the future.

Figure 1
MILK PRODUCTION
COMMERCIAL DISAPPEARANCE

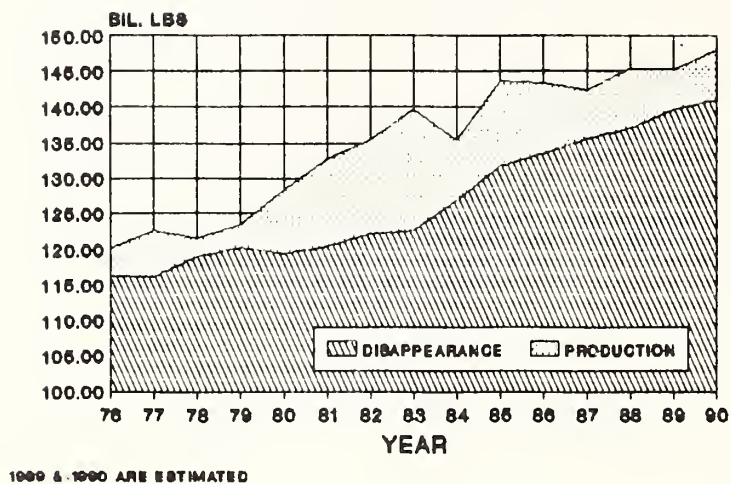


Figure 2
PERCENTAGE OF PRODUCER MILK BY REGION

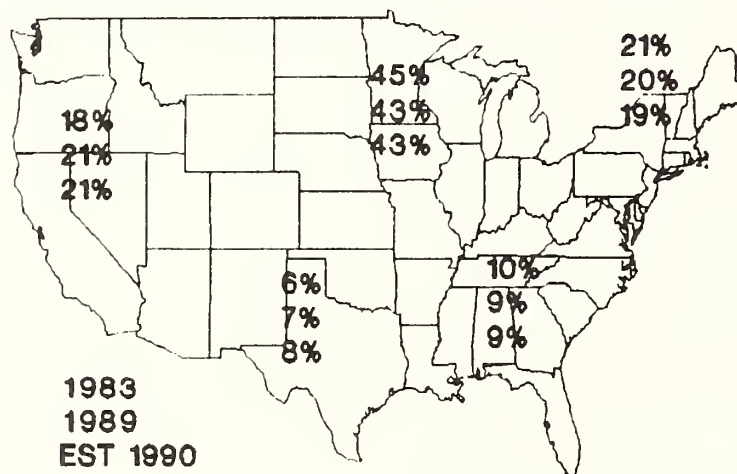


Figure 3
CHEESE, BUTTER, POWDER PRICES

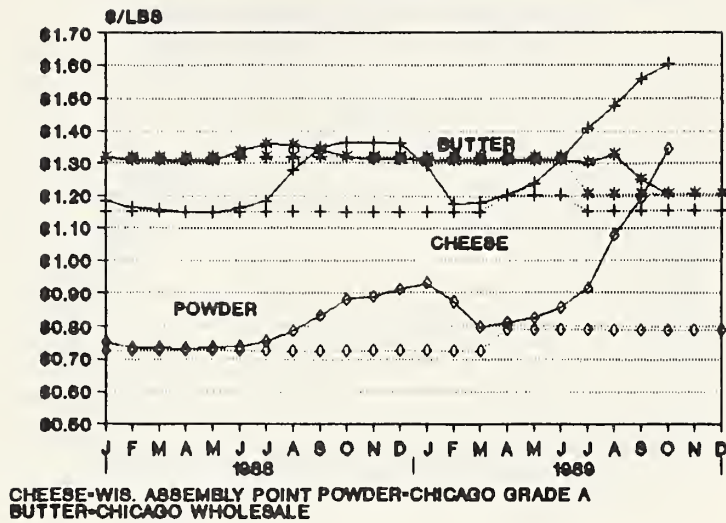


Figure 4
MINNESOTA-WISCONSIN PRICE
SUPPORT PRICE

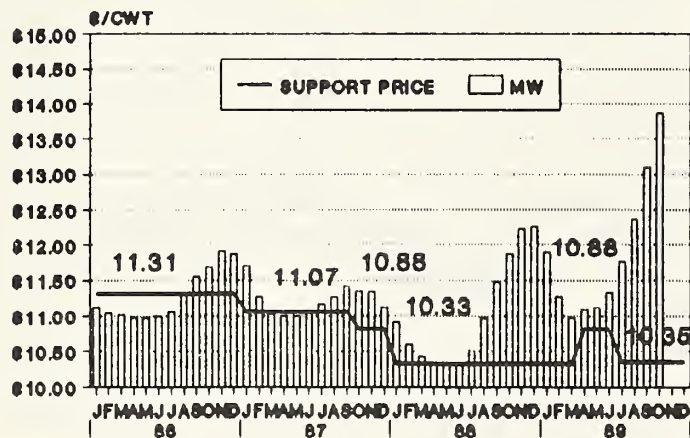


Figure 5
MINNESOTA-WISCONSIN PRICE
JANUARY 1988 TO JUNE 1990

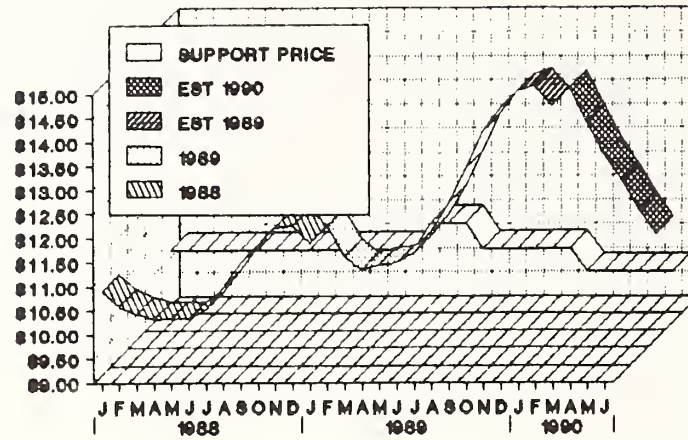


Figure 6
1989 vs 1988 MINNESOTA COW NUMBERS

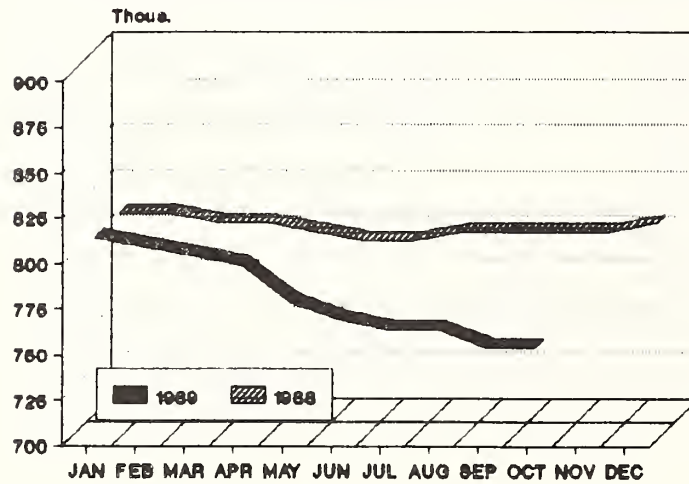


Figure 7
1989 vs 1988 WISCONSIN COW NUMBERS

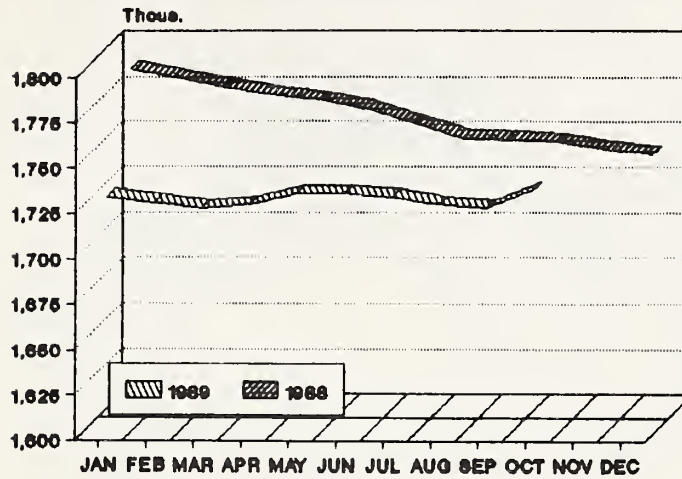


Figure 8
1989 VS 1988 MINNESOTA MILK PER COW

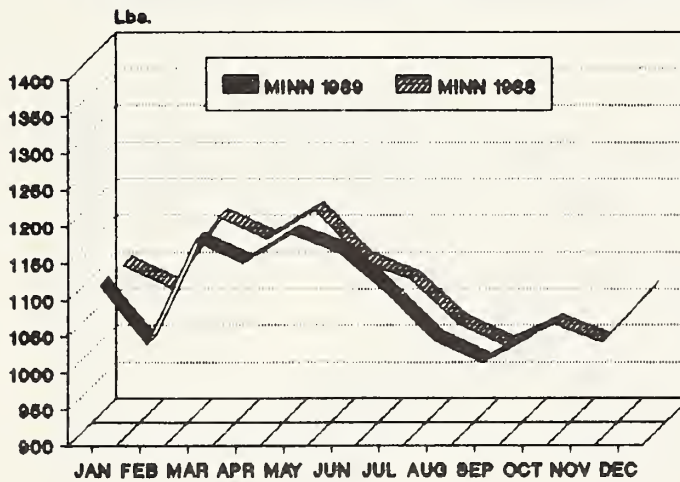


Figure 9
1989 VS 1988 WISCONSIN MILK PER COW

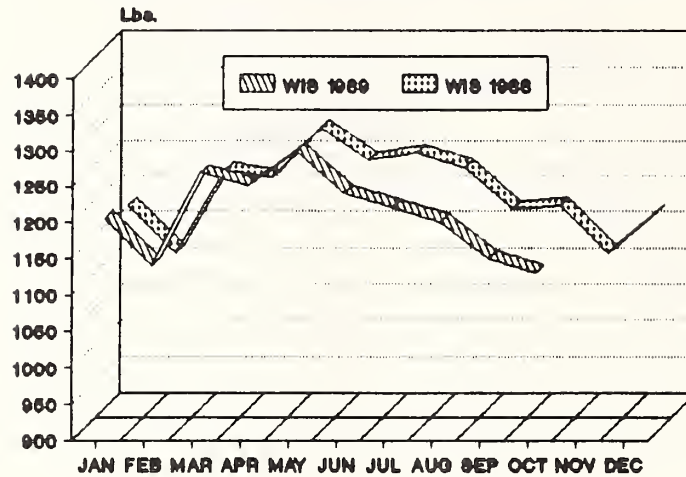


Figure 10
1989 VS 1988 MINNESOTA MILK PRODUCTION

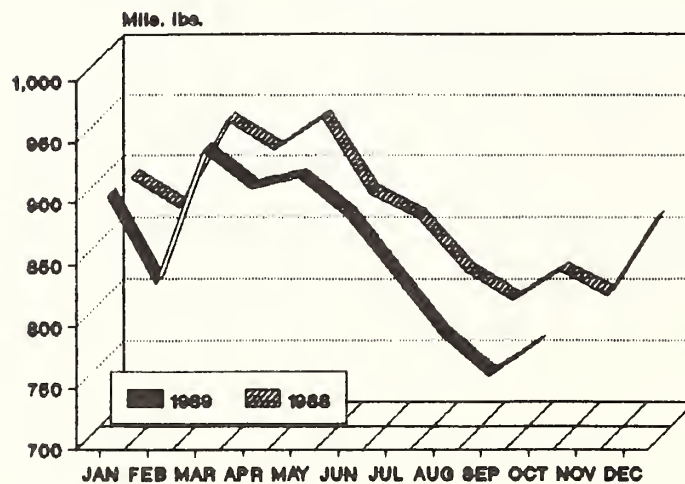


Figure 11
1989 vs 1988 WISCONSIN MILK PRODUCTION

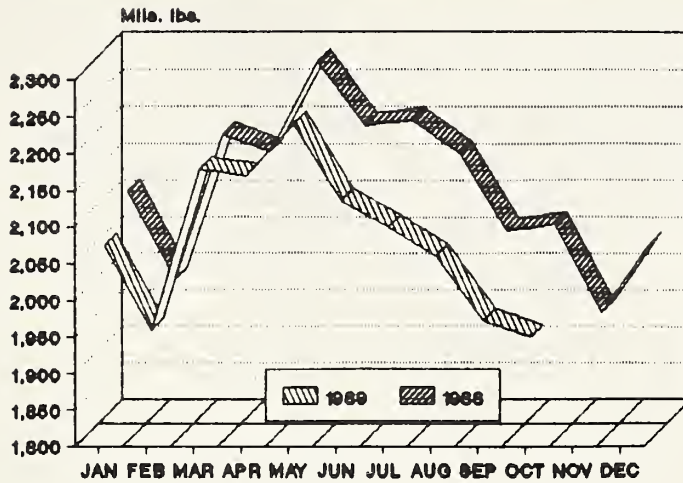
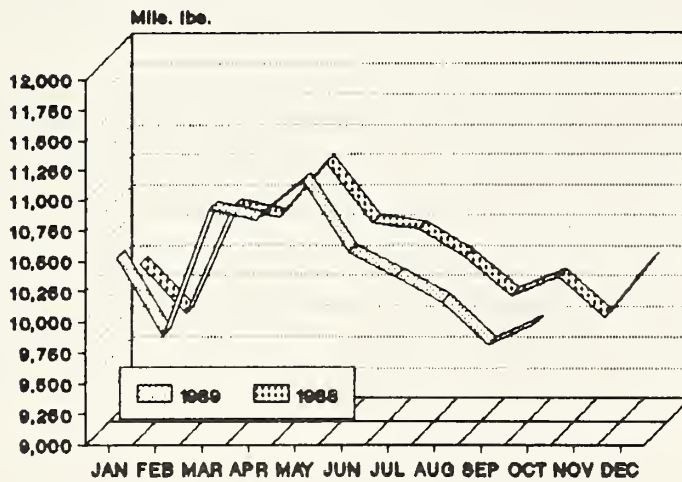


Figure 12
1989 VS 1988 21 STATE MILK PRODUCTION



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IMPLICATIONS OF GLOBAL CHANGE FOR AGRICULTURE

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I am to speak on the implications of global change for agriculture. Global change means different things to different people. In general, the term has come to suggest changes in the landscape, changes in the chemistry of our water supplies and, most prominently, changes in the constituents and behavior of the atmosphere. Soil erosion, deforestation, desertification, soil salinization and water logging are also considered to be manifestations of global change. Decreasing genetic diversity caused by deforestation in the tropics and extensive use of monoculture throughout the world is another important form of global change. It is not possible to discuss all of these processes in the limited time available, so I will confine myself to the question of climate change and allow that concern to illustrate the nature of the scientific and policy questions that global change raises for agriculture. Specifically, I will deal with the greenhouse effect.

Somewhere within the U.S. there is rumored to be an individual who has not yet heard of the greenhouse effect. The rumor insists further that that individual might actually be in this very auditorium today. Just to be on the safe side I will briefly explain what this greenhouse effect is all about.

The gases of the atmosphere are relatively transparent to incoming solar radiation. All surfaces emit radiation, but surfaces as cool as those of the earth emit most of their radiation in the infrared or thermal waveband. Some of the gases of the atmosphere are less transparent to this form of radiation and so absorb a portion of it as it passes through the atmosphere on the way to back space.

Water vapor is the most prominent of the so-called "greenhouse gases". Carbon dioxide (CO_2) and other gases such as methane (CH_4), nitrous oxide (N_2O) and the chlorofluorocarbons (CFC's) are also greenhouse gases. Figure 1 shows that CO_2 has been increasing in concentration in the atmosphere since at least 1958 when systematic observations were started at a mountain-top observatory in Hawaii. We have good reason to believe that the pre-industrial concentration of CO_2 was about 280 ppm. It was 315 ppm in 1958. It is 350 ppm now. The combustion of fossil fuels (coal, oil and gas) since the beginning of the industrial revolution accounts for much of this increase.

Land use change has also contributed importantly as forests were cut and prairies ploughed to open lands to agriculture. Land transformations continue today. Deforestation in the tropics may be contributing 10 to 20 percent of the carbon dioxide which continues to accumulate in the atmosphere; most of the carbon dioxide today is coming from fossil fuel combustion, however.

There is much less methane than carbon dioxide in the atmosphere (just a few ppm), but the rate of increase is very rapid (Figure 2). Molecule for molecule methane is about 30 times more absorbent of infrared radiation than carbon dioxide although it's lifetime in the atmosphere is considerably shorter--about 9 years compared to 100 years. CH_4 is emitted from the digestive tracts of ruminant animals. It is also generated in waterlogged soils--swamps, wet meadows, rice paddies. How much actually comes out of wetland soils is really not well understood at this time. Other sources of CH_4 include coal mines, gas pipelines and landfills.

Nitrous oxide is another gas that is accumulating rapidly in the atmosphere (Figure 3). It, too, is a very strong absorber of infrared radiation and has a long residence time in the atmosphere. Nitrous oxide is a product of fossil fuel combustion but it is also emitted through the processes of anaerobic denitrification and aerobic nitrification. The non- CO_2 gases have probably been less important in the past but, since they are increasing more rapidly than CO_2 , are expected to account for more than 50% of the atmospheric warming predicted to occur by 2030.

We have seen, then, that agriculture is an important contributor of greenhouse gases to the atmosphere. When we convert land from high carbon stocks such as forests to low carbon stocks such as pastures or annual cropping, we release significant amounts of CO_2 into the atmosphere; nitrogen fertilizers are one source of nitrous oxide; ruminant animals and rice cultivation add to the emissions of methane. Agriculture is clearly a part of the problem, but there are ways in which agriculture can be a part of the solution as well.

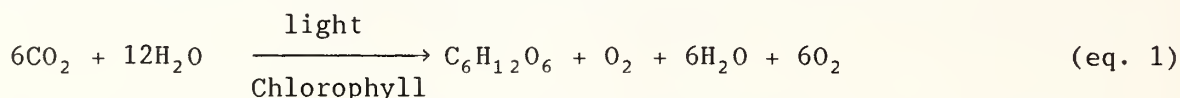
Why are we concerned about this greenhouse effect? Wouldn't a little bit of warming be good for everybody? Even a lot of warming might be good for certain portions of the world. The reason for concern is not the warming, per se, but rather that the warming could lead to profound changes in the distribution of rainfall, evapotranspiration, climate variability and the occurrence of extremes such as droughts, floods, hailstorms, etc. But do we actually know how global climate change will play out throughout the world? A simple answer to that question is no, we do not. There are some plausible scenarios based on the results of global climate models-- among them an increased intensity of monsoons in Asia and Africa and an increased drying of the midcontinental areas of the Northern Hemisphere due to reduced precipitation and increased evapotranspiration. Interestingly, while some regions become drier others will become wetter since, as the atmosphere warms, there will be more evaporation from the oceans and land, more water in the atmosphere and, thus, more precipitation. But unfortunately we don't know where that precipitation will be going.

We rely primarily on global climate models (GCMs) to tell us how much warmer the world will be, say, when the carbon dioxide concentration is double what it was in the preindustrial world (or the effect of all the greenhouse gases is effectively equal to doubled CO_2). The state of the art in climate

prediction is illustrated by Figures 4 and 5. The first of these figures compares the results of three different GCM models in predicting temperature change in summer for North America and for Africa under doubled CO₂ (or equivalent). The stipple indicates a warming of more than 4°C. Note that one of the models suggest extreme warming, particularly in the central portion of the U.S. while the other models suggest only moderate warming. The disagreement among models for Africa is even more striking. Figure 5 shows the precipitation that might occur with a doubled carbon dioxide concentration--which could happen between, say, 2030 and 2100, depending on future rates of greenhouse gas emissions. The stipple indicates a decrease in precipitation. The disagreement among models, here too, is less than reassuring.

To summarize let me say that, in my opinion, the continued emissions of greenhouse gases into the atmosphere at current or accelerated rates must lead to a warming of the lower atmosphere and an alteration in the climatic patterns that now exist. But how the regional lottery of climate change will play out is not known or knowable with the tools available to us at this time.

Now let me turn to an area in which there is more certainty. As shown in equation 1, photosynthesis requires a supply of carbon dioxide.



Two major categories of higher plants--the C₃ and C₄ groups--respond differently when the air in which they grow is enriched with CO₂. C₄ plants are tropical grasses (maize, sorghum, millet, sugar cane) and the C₃ plants include most or all trees, the small grains, the legumes, and most pasture species. A list of common C₃ and C₄ plants is given in Table 1. Figure 6 shows that a typical C₃ plant growing at 300 ppm--nearly the current ambient carbon dioxide concentration--becomes light saturated well below full natural light intensity. A typical C₄ plant does not become light saturated at 300 ppm CO₂ and has a photosynthetic rate about double that of the C₃ plant. However, when a C₃ plant is put in an atmosphere of 600 ppm of CO₂ its photosynthetic rate increases greatly and it behaves very much like the more productive C₄ plant. Of course many greenhouse operators know about this response and maintain an elevated CO₂ concentration in their structures in order to increase photosynthesis.

Figure 7 is a photomicrograph of a stomate, a pore in a plant leaf--in this case a sugar beet leaf. There are many thousands of these pores in each square centimeter of plant leaf. The stomates control the rate at which CO₂ enters the leaf and the rate at which water vapor exits it. The guard cells that control the opening and closing of the pore are sensitive to CO₂ concentration. The higher the concentration of CO₂ in the atmosphere the more the stomates close, thus increasing the leaf's resistance to the escape of water vapor to the atmosphere. Therefore, CO₂ enrichment of the atmosphere reduces transpiration and water use in both C₃ and C₄ plants. The water use efficiency of plants (the amount of photosynthate produced per unit of water consumed) is increased-- again, a very beneficial effect.

Now many have argued that this water-saving effect will not occur in the real world because other limiting factors--shortage of soil moisture or nutrients--would prevent its expression. It has been found, however, that carbon dioxide actually reduces the impact of water stress and salinity stress and it may also alleviate some nutrient shortages, although the evidence in the latter regard is less clear.

What does all this mean for the future of agriculture in the United States and the world? A number of assessments have been made of the impacts of GCM-prescribed climate changes on crop growth. In my view most of these studies tend to overestimate the losses that might occur. One case in point is shown in Figure 8. The corn belt is predicted to contract from its current borders and move to the northeast and then only a small portion will be able to produce corn without the help of irrigation. Such a result seems very unlikely to me, but it is not always the plant growth models used in these studies that are at fault. Their outcome is determined primarily by the GCM climate change scenario used to drive the plant growth model. The deleterious climatic effects are not always compensated in these analyses by the CO₂ fertilization effect. Further, higher temperatures lead to more rapid accumulation of heat units, forcing the models to cut off the growth and harvest the plants before enough photosynthate has accumulated to produce reasonable yields. Most seriously, in my view, these analyses do not consider even the simplest adaptations--those that can be made by farmers using technologies and varieties that are available today. It seems very unlikely that farmers, perceiving a trend in year-to-year climate will fail to adjust by changing varieties and introducing new management techniques. Further, we believe that significant climate change is some decades--perhaps even a century--away. Technologies available then will make today's technologies appear incredibly primitive to our successors on the planet.

I think it fair to say that the state-of-the-art in assessing impacts of climate change on agriculture is not as advanced as it should be. Most of what we have seen in the studies done up to now deals, essentially, with worst-case conditions. While worst-case makes good headlines, it makes a poor basis for policy and planning. A group of analysts at Resources for the Future, working with the support of the Department of Energy, are now attempting to improve impact assessment methodology, concentrating our effort for the moment on the area of Missouri, Iowa, Nebraska and Kansas (the MINK region we call it). We are trying to understand how a climate change would impact on the entire regional economy of which agriculture is only a part, but a part which influences the whole and is greatly influenced by it. In doing our study we are making use of one of the models developed by USDA and university scientists (the EPIC model developed at Temple, Texas). We have modified the model fundamentally to deal not only with climate change but with the direct effects of elevated carbon dioxide concentration on photosynthesis and transpiration. This study of the MINK region will be completed by the end of September, 1990. The climate change that we are imposing on this region is not drawn from a GCM. Rather we are replaying the decade of the 1930's, as it occurred and where it occurred. This should not be construed as a prediction that the 1930's will return or that the new equilibrium climate will be like the 1930's. However, since all GCM's predict warming (the 1930's were the warmest period in U.S. history) and some predict drying for the MINK

region, the decade of the 1930's provides a logical surrogate or analog climate with which to test our methodology.

What should U.S. agriculture be doing or thinking about now with respect to climate change. First let me submit that we know enough to justify concern and preparedness. Analyses done at Resources for the Future lead us to believe that there are essentially three courses of action open to the nations that may lose agricultural comparative advantage because of climate change. These appear in Table 2.

With this guidance in mind, what should the Department of Agriculture now be doing to prepare us for climate change? The Department has been responsible for much of the research I have cited on the direct effects of carbon dioxide. Over the last decade or longer there has been a small but well-focused research program concerning these direct effects. What I find strange, in a way, is that this important research has been done apparently because funds were available from the Department of Energy and USEPA. Hence, USDA has been more a contractor than a leader in defining the research agenda. That is until recently: the Department is now playing a more vigorous role and the proposed budget for ongoing research or for research planned to begin in FY91 is about \$235 million per annum. Of this sum, \$70 million will be for tightly focused research dealing with the issues that I have laid before you and \$165 million would be research with other primary objectives but that contributes to the overall program. Among the strategies to be studied with regard to limitation and mitigation of the greenhouse warming are reforestation, conservation tillage, Great Plains conservation program and low input sustainable agriculture--all of which should either reduce carbon emissions to the atmosphere or store more carbon on the land. Among the adaptive strategies to be studied are integrated pest management, tree breeding and resource planning. This is a good agenda--although there is probably room for other, potentially useful mitigation and adaptation strategies. An agricultural weather information system which is now being planned can also be a very important means of helping agriculture adjust not only to climate change but to the natural variability in climate which bedevils us year by year.

I was pleased to learn that the Department of Agriculture is also putting some small (very small!) amount of its research money into policy analysis on the issues of global change. The horse may be too small for the cart, however, since the role of policy analysis in dealing with the global change question should be to provide the primary guidance as to what research needs to be done. In order to focus the Department's research programs most effectively on the problems associated with global change, the questions that need answers must first be defined and policy studies contribute to that process of definition.

To summarize: climate change is one major aspect or facet of the global changes that we may have to cope with in the coming century. The physics of the greenhouse effect are well understood but, at this time, the regional effects are predictable, if at all, in only the barest detail--and this is the way it will be for some time to come. The direct effects of the carbon dioxide accumulating in the atmosphere are good for plants. If only that carbon dioxide (and other greenhouse gases) did not threaten to alter climate patterns we would be facing these issues in a self-congratulatory mood rather than a worried one.

Agriculture is a significant source of some of the most important greenhouse gases, but agriculture (including forestry) can be a major factor in limiting the rate of accumulation of carbon dioxide in the atmosphere. Faced with climate change all societies and all agricultures will have to adapt and develop a set of consistent policies which should emphasize national and global food security above all else.

The Department of Agriculture has been an important provider of new knowledge about the direct effects of carbon dioxide but also a hesitant player with respect to the larger issues until recently. With its capable research staff and impressive facilities, and with its experience in dealing with complex and serious science and policy questions, the Department of Agriculture should be expected to make very important contributions to improved understanding of the processes of global change. The Department also faces the challenge of finding ways to mitigate global change where possible, and ways to adapt to its impacts, where necessary.

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Table 1. Some C_3 and C_4 plants. (Source: Goudriaan and Ajtay, 1979).

C_3 plants	C_4 plants
Hordea (wheat, barley, rye)	Chlorideae (Rhodes grass)
Aveneae (oats)	Maydeae (maize)
Agrostideae	Andropogoneae (sorghum)
Festuceae	Eragrosteae
Oryzoideae (rice)	Saccarum (sugar-cane)
Atriplex patula	Spartina
Beta (sugar beet)	Atriplex rosea
All leguminous species	
Helianthus (sunflower)	
Gossypium (cotton)	
Solanum (potato, tomato)	

Table 2. Choices for the losers of agricultural comparative advantage
(Source: Easterling et al., 1989).

Choice 1

Accept loss of comparative advantage and increase food imports from advantaged or unaffected countries or regions of countries. Requires policies that encourage movement of people, land and resources out of agriculture, assuring them productive employment in non-agricultural sectors of the economy.

Choice 2

Resist climate-induced declines in comparative advantage by spurring research on development of adaptative measures. Hold resources in agriculture but change their mix and maybe their location within countries. Requires foresight as to agricultural consequences of climate change and policies that encourage resources into appropriate lines of research and among regions within countries.

Choice 3

Protect the agricultural sector by restricting imports from advantaged or unchanged countries--despite higher economic and environmental costs.

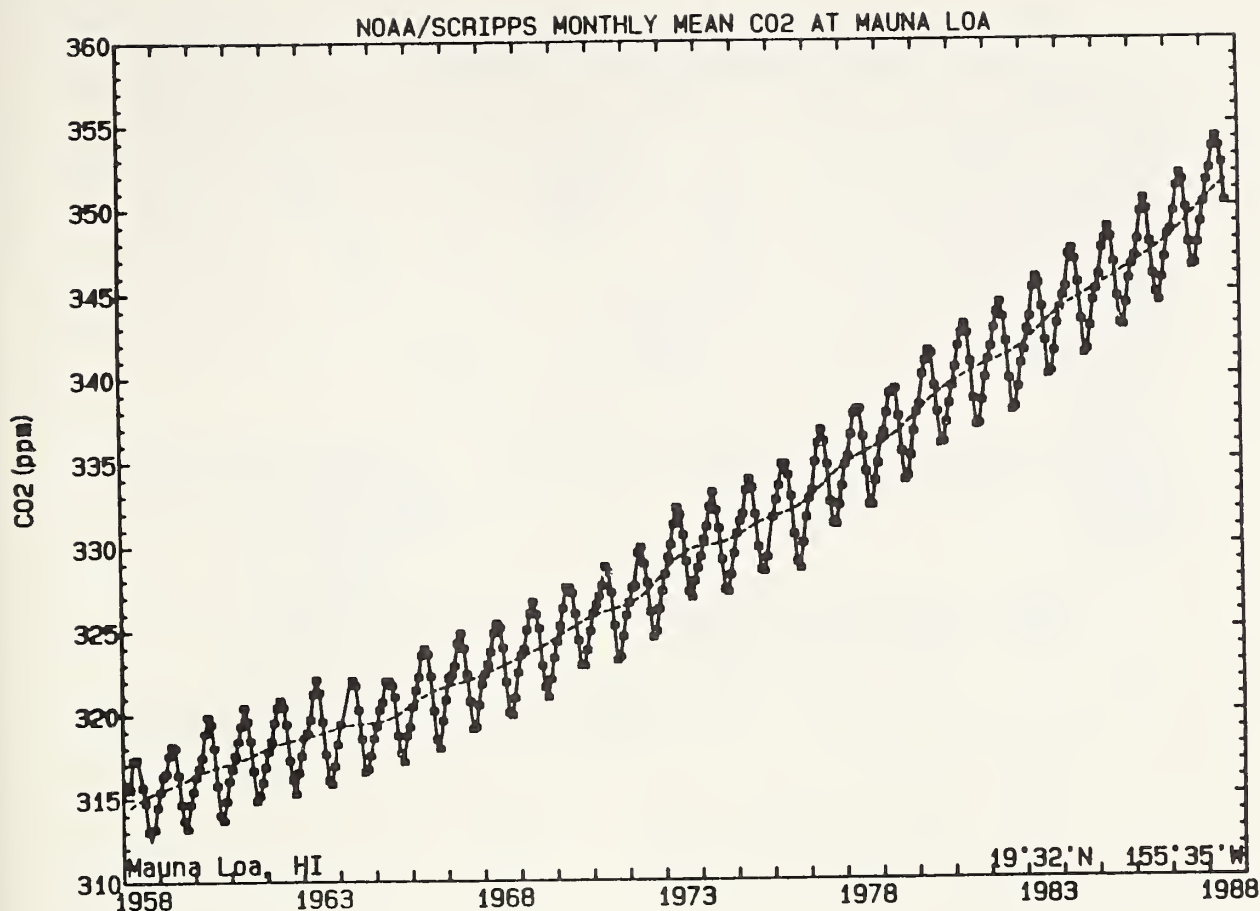


Figure 1. NOAA/SCRIPPS Monthly Mean CO₂ Concentration at Mauna Loa.

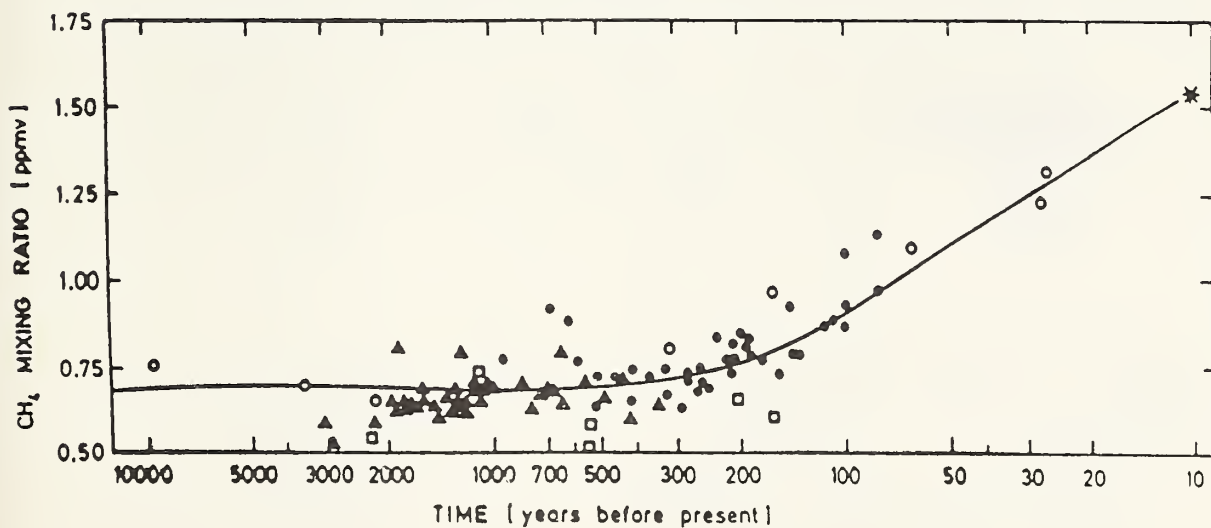


Figure 2. CH₄ mixing ratios measured in air trapped in ice cores as function of time. (Source: Bolle et al., 1986).

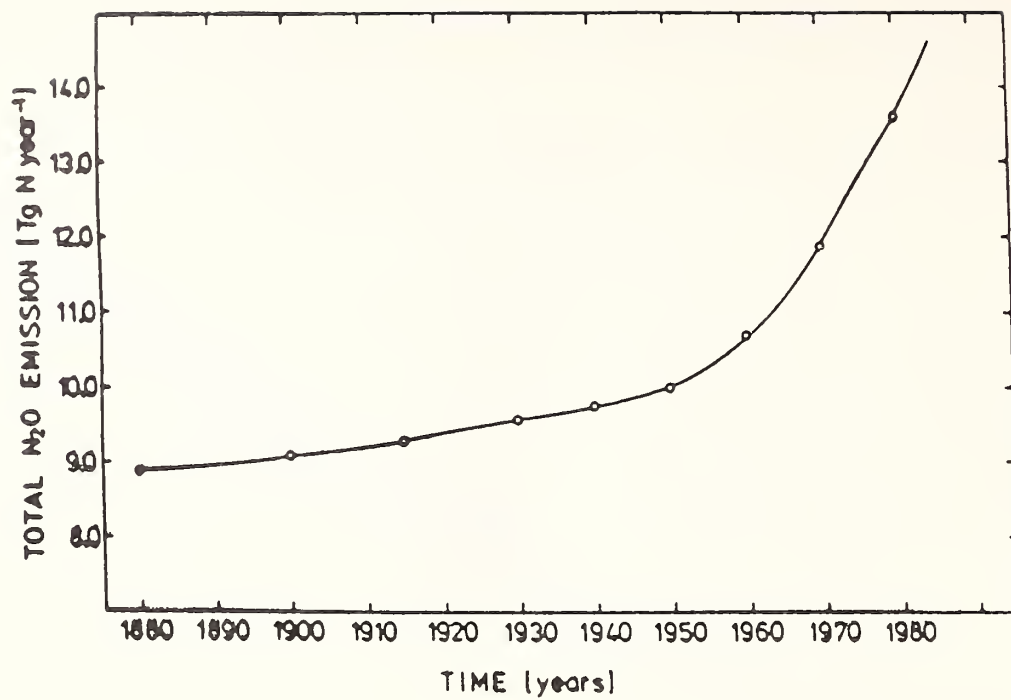


Figure 3. Trend of estimated total N₂O emission rates between 1880 and 1980. (Source: Bolle et al., 1986).

TEMPERATURE (June, July, August)

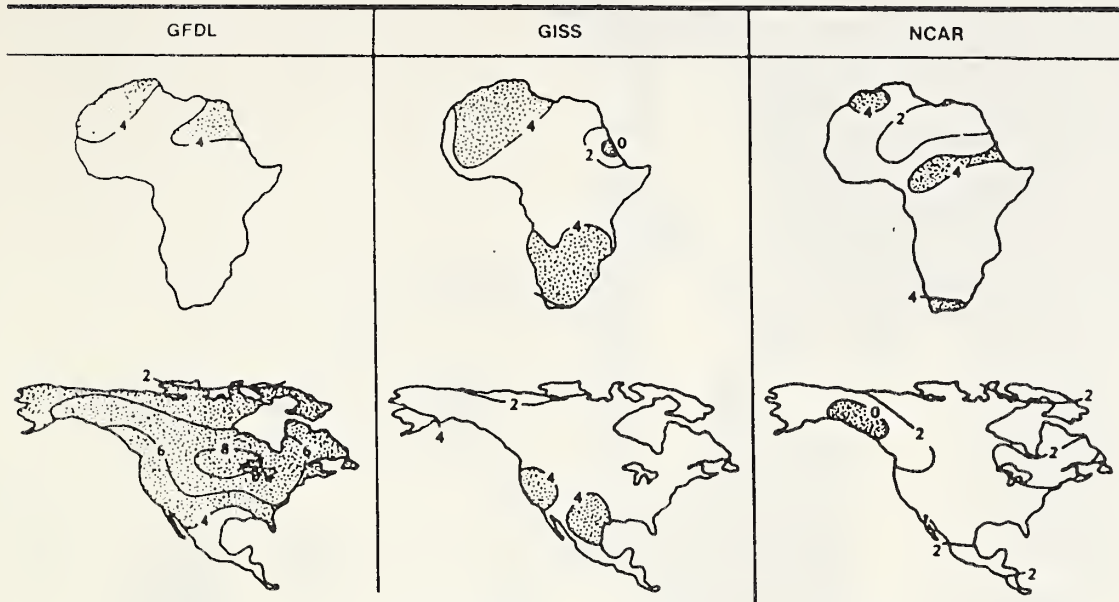


Figure 4. The distribution of surface air temperature change ($^{\circ}\text{C}$) for a doubling of atmospheric carbon dioxide concentration for June, July, and August simulated by the global climatic models of GFDL (left), GISS (center), and NCAR (right). Stipple indicates temperature increases greater than 4°C . (Adapted from figure 4.39 of Schlesinger and Mitchell, 1985.)

PRECIPITATION (June, July, August)

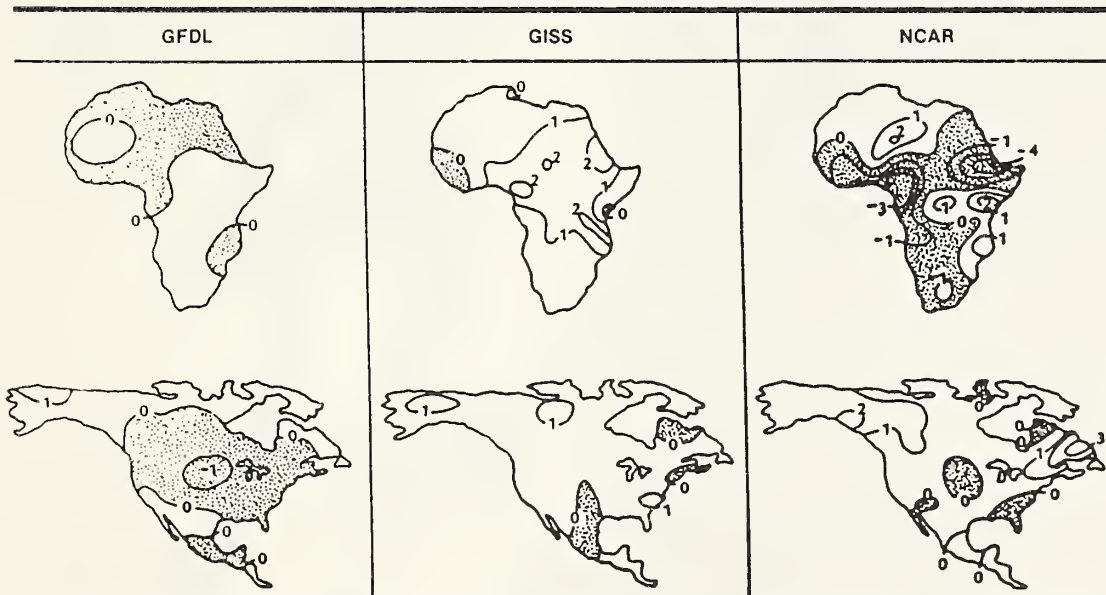


Figure 5. The distribution of precipitation rate change (mm/day) for a doubling of atmospheric carbon dioxide concentration for June, July, and August simulated by the global climatic models of GFDL (left), GISS (center), and NCAR (right). Stipple indicates a decrease in precipitation rate. (Adapted from figure 4.42 of Schlesinger and Mitchell, 1985.)

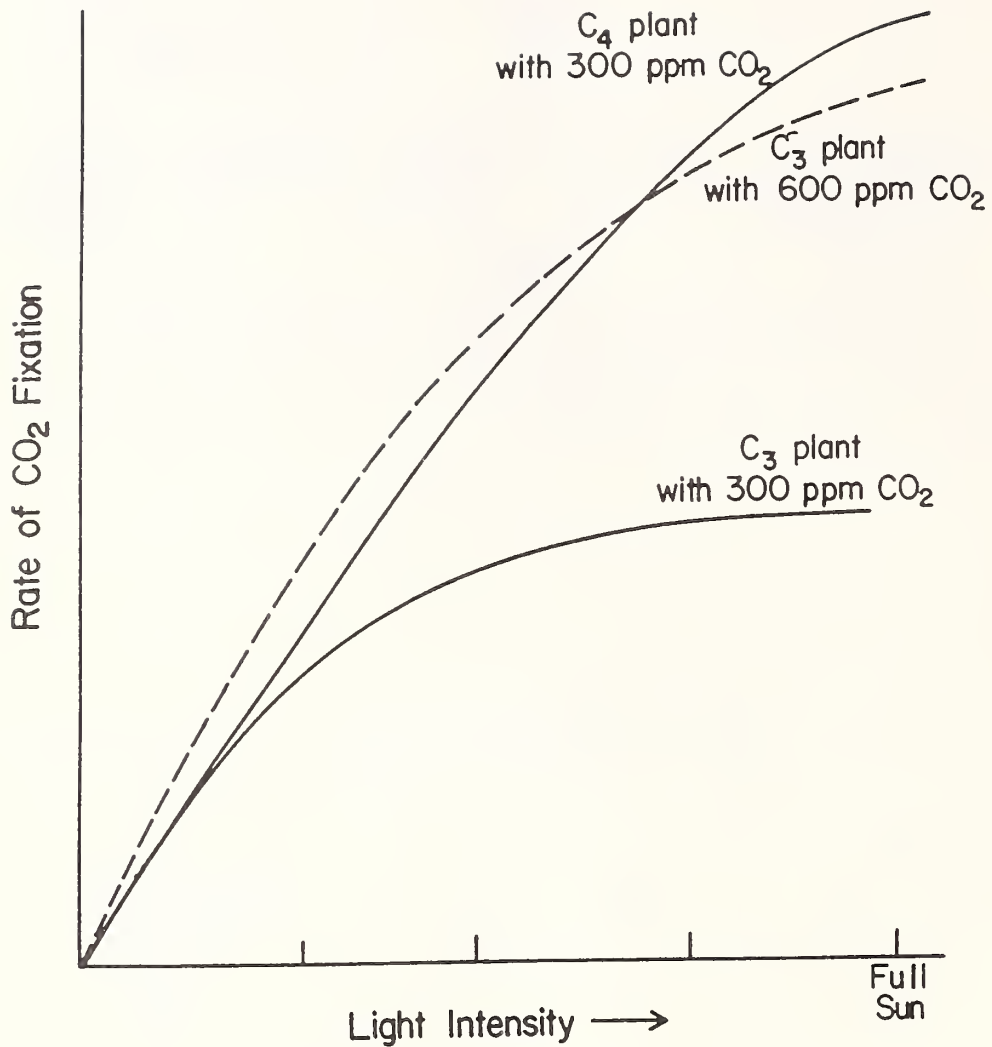


Figure 6. Schematic presentation for the approximate rate of photosynthesis in air with increasing light intensity. A C₃ plant at 300 and 600 ppm CO₂ compared with a C₄ plant at 300 ppm CO₂. (Source: Tolbert and Zelitch, 1983).



Figure 7. Photomicrograph of a sugar beet leaf showing a stomate and its two guard cells.

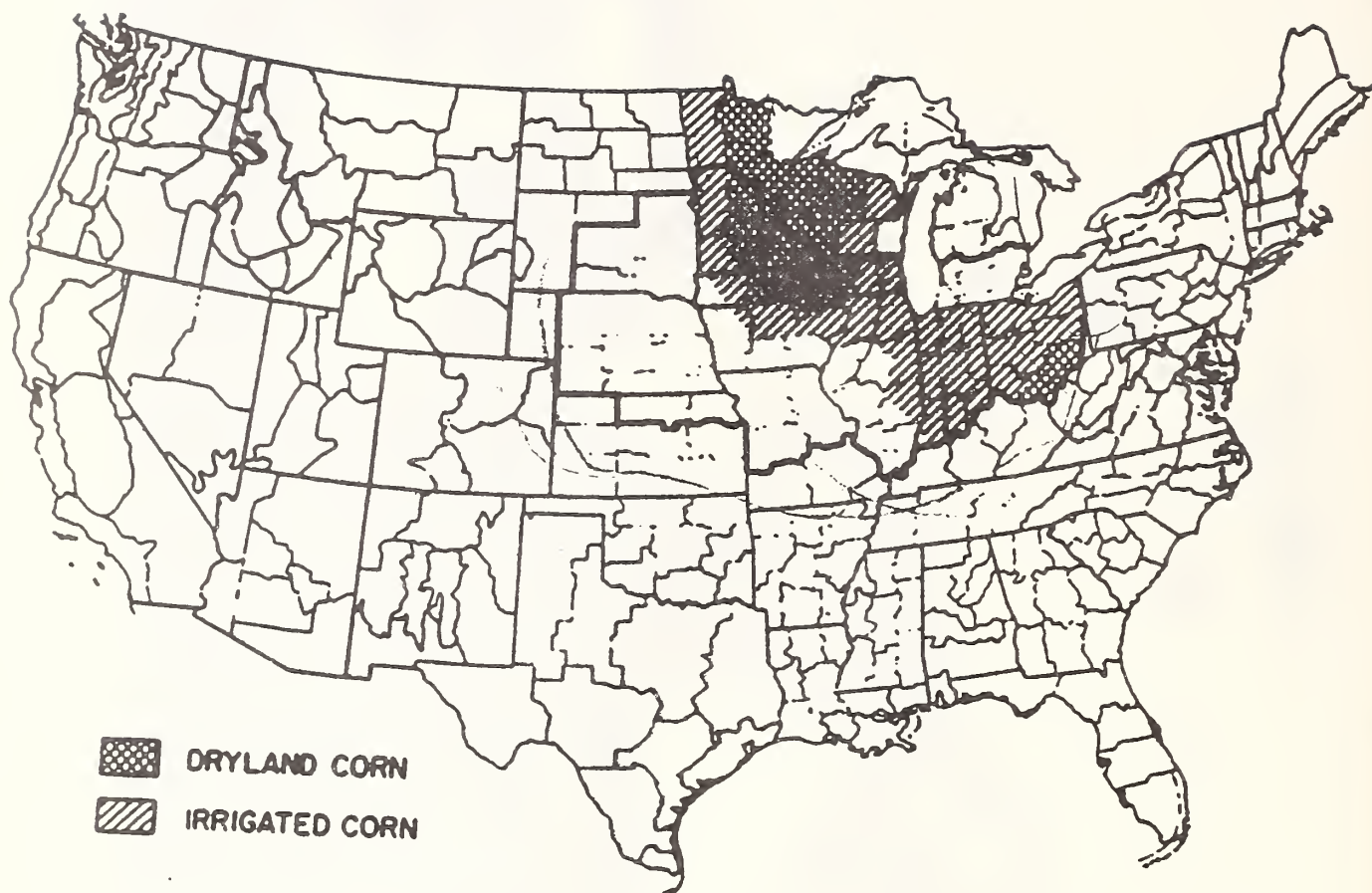


Figure 8. Current borders of the corn belt (bold line) and possible borders after greenhouse-induced warming. (Source: Blasing and Solomon, 1982).

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DISASTER PROTECTION IN AN ERA OF WEATHER EXTREMES*

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Thank you, Dr. Hess. It's a pleasure to be here this morning. My topic is going to be a little bit less long-term in view than Dr. Rosenberg's. However the changing climate over the long run may affect agriculture on a macro-basis, on a micro basis the individual producer has to protect himself, has to be in a position, whether it is a drought like 1988, to handle the year-to-year fluctuations.

We believe that it is good policy to offer disaster protection and to be sure that individual farmers have it available to them. We believe it is good policy for several reasons. First, it enhances the efficient use of farm resources. Farmers who can plan for and make economic investments and decisions for the long term are more likely to run economically efficient operations than those whose main concerns are how they will survive the next harvest. Second, it eases the economic burdens imposed on farmers, rural communities, rural banks, rural suppliers, and other agricultural-dependent rural industries caused by a local, regional, or national weather-induced disaster scenario of reduced harvest. Third, it reduces the financial shocks associated with crop disasters. It permits the farmer to come back and replant. It helps to stabilize the food supply. So we believe that especially in an era of fluctuating weather, it is good public policy to ensure that producers have available to them the means to protect against disaster.

The private sector has provided hail and fire insurance for some years. The Federal Government has been involved for 50 years in providing some limited crop insurance disaster protection. Expanded in 1980, it now is offered nationally on all of the commodity program crops and on some 40 additional crops. These crops cover about 75 percent of all planted acres and a somewhat smaller percentage in dollar value.

Additionally, over the last decade and three times during this decade there have been major ad hoc disaster bills passed to assist farmers who either chose not to insure or did not have access to crop insurance. Also, during the late 1970's and early 1980's there was a very large program of disaster emergency lending to distressed farmers who had crop failures. That program is somewhat smaller than it was. But altogether, over the decade of the 1980's, the Federal Government has expended, on average, over \$1 billion a year in assisting farmers to withstand the financial difficulties caused by varying weather.

*Based on a transcript.

What does that mean for the future? Today's crop insurance is not the right tool to be used in the future. There is widespread concern and condemnation of crop insurance by producers. Even though we have been at it now for nearly a decade, still only about 40 percent of eligible farmers choose to buy crop insurance. Obviously, even though heavily subsidized, it is not a tool that they find particularly effective and it has not forestalled ad hoc disaster bills in increasing frequency and in large dollar amounts. Moreover, the program has run very large unexpected and unbudgeted deficits, and this is a situation that obviously, in an era of tight budget constraints, cannot continue.

With the Farm Bill coming up in 1990, there will be substantial attention paid to what mechanism ought to be used to deliver disaster protection to farmers. We believe that there are only four issues that differentiate all of the various means of crop insurance or of disaster protection that might be offered.

First, is who bears the cost? Is there farmer participation in the cost? Is it a grant program where the cost is borne entirely by the Government? Clearly, a free resource leads to abuse and leads to bad economic decisions. As a policy issue, we believe that the producer should make a contribution to the cost of disaster protection.

Second, what is the trigger mechanism which will cause a claim or cause a payment to be made to a producer? Is it a loss on the individual farm? Is it a loss in an area? Is it a loss nationally, a harvest nationally that is keyed perhaps to a harvest of 90 percent or less of what had been anticipated? We believe generally that the amount of the loss payment and whether there is one ought to be geared to the individual farmer's loss and its size. Therefore, the loss should be based upon an individual's farmer's loss compared to what he might reasonably have expected to harvest.

Third, who qualifies for participation in this disaster assistance program? All farmers? Only program crops? To the extent that it is a voluntary program with a producer payment, are all crops in all areas or only crops that have a reasonable chance of successful growth and harvest going to be covered? And if it becomes a mandatory program, again, is it only program crops or does it include the non-program crops?

Finally, what is the delivery mechanism for the disaster protection? Is it via crop insurance by way of a private delivery system subsidized by the Federal Government? Or is it going to be delivered directly by ASCS or some other agency of the Federal Government such as ad hoc disaster has been in the 3 years that we've done it in this decade? Generally we want to rely on the private sector to the greatest extent possible. To the extent that this is not a grant program but is a program where the producer makes payments, and this is a program that is not mandatory but voluntary, there are good public policy reasons to rely on the private sector to deliver the product.

In sum then, something that looks similar at least in principle to the crop insurance program is probably the way to go if we can fix it. Fixing it addresses four areas: First, clearly the product has to be acceptable to the producer, more so than it is today. Producers have to be comfortable that they are getting sufficient protection for a reasonable price.

Second, if crop insurance is to be supported by the private sector, then it must be a sound insurance product. Over the decade of the eighties, we have paid \$1.56 in claims for every \$1.00 of premium that we've collected. Clearly, that's not a private sector type of a business. The program has to be adjusted to be budgetarily responsive and to actuarially sound. In certain areas in some crops today it is not.

Third, the public-private sector relation has to be reviewed. Disaster protection per se, catastrophic protection, is not an insurable event in the classic definition of insurance. Drought in one State is not independent from drought in another State. One of the key factors that makes something insurable in the classic sense is that losses are independent of each other. That's why hail insurance or fire insurance can be successfully underwritten by the private sector, while drought insurance and other macro events that cover entire States, regions or even larger areas are not insurable in the private sector. That is a legitimate role for the public sector. However, we believe we need to structure our disaster program such that the underlying normal fluctuations that take place year to year, say, the 10-year average that can be borne by the insurance industry and that are insurable under the classic definition of insurance, can be insured and that our structure is such that it will be insurable.

Finally, given this new structure, the organizational structure of the Federal Crop Insurance Corporation would need to be revised to reflect its new role as a catastrophic reinsurer and as a regulator in some other related areas.

The Department is in the midst of its deliberations to make a proposal as part of our farm bill strategy. Any proposal is obviously a complex one. It requires the insurance industry, the producers, Congress, and the Administration to work with some very difficult issues to come to some solutions. I think you will be hearing over the next 60-90 days a formal Administration proposal as to how to continue this very important policy issue of delivering disaster insurance and protection to farmers on a year-to-year basis.

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
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Outlook '90, Session 23

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ECONOMIC IMPLICATIONS OF A CHANGING WORLD FOR U.S. AGRICULTURE IN THE 1990'S

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In this session we are taking a longer-term view than in much of the Outlook Conference. It is important to consider the longer-term outlook, and keep it in mind when making immediate decisions on both private and public policy matters. But it is also important to keep in mind the uncertainty in any long-term projections. Past ones have a remarkable record of being wrong. There are too many sources of changes that cannot be forecast. This isn't just a matter of transitory shocks such as droughts. The rate of change of underlying trend variables, such as population, can and have changed unexpectedly and these changes can cumulate for years making distant forecasts look not only wrong but downright foolish.

The program this morning emphasizes two dimensions of longer-term change: the physical environment on which agriculture depends, and the world economy, which combines the physical world and our use of it for production.

Events such as global warming are unlikely to affect agriculture directly in the 1990's but anxiety over the physical environment and the effects of environmental changes will affect agriculture through regulation of inputs and methods of production. During the coming decade, it would be reasonable to expect that USDA, other agencies of Government, the Congress, and public groups will be making proposals for environmental and food safety regulations and some of these proposals will be adopted as laws or regulations. As I expect the speaker to follow me will make clear, the agricultural economy will continue to be heavily influenced by national agricultural policies. The success of policy reform in the Uruguay Round could well be a pivotal event in forming the world environment and the outlook for U.S. agriculture in the world of the 1990's.

The way I would like to proceed this morning is to point to long-term trends up to the present, and to discuss forces that are likely to alter these trends in the future.

To start, it is important to recognize those underlying forces influencing world and U.S. production and demand. Figure 1 indicates that total world agricultural production grew steadily, at 2.6 percent a year, from 1961 through 1985. Since world population grew at a slower rate, growth in agricultural output per capita was also on a generally upward trend.

Figures 2 through 5 show total and per capita agricultural production indices in China, centrally planned countries in Eastern Europe and the USSR, developed countries, and developing countries (LDC's). Because the scales are in logs, the upward slopes of these lines indicate the relative growth rates in the charted indices. Eastern Europe and the USSR were experiencing respectable, but uneven, growth until the late 1970's, but seem to have reentered a steady growth phase. China had a remarkable growth spurt in 1977-83. The developed countries grew steadily until the early 1980's and then experienced a break in trend. The developing countries generally have been growing faster than the developed countries and the other centrally planned countries.

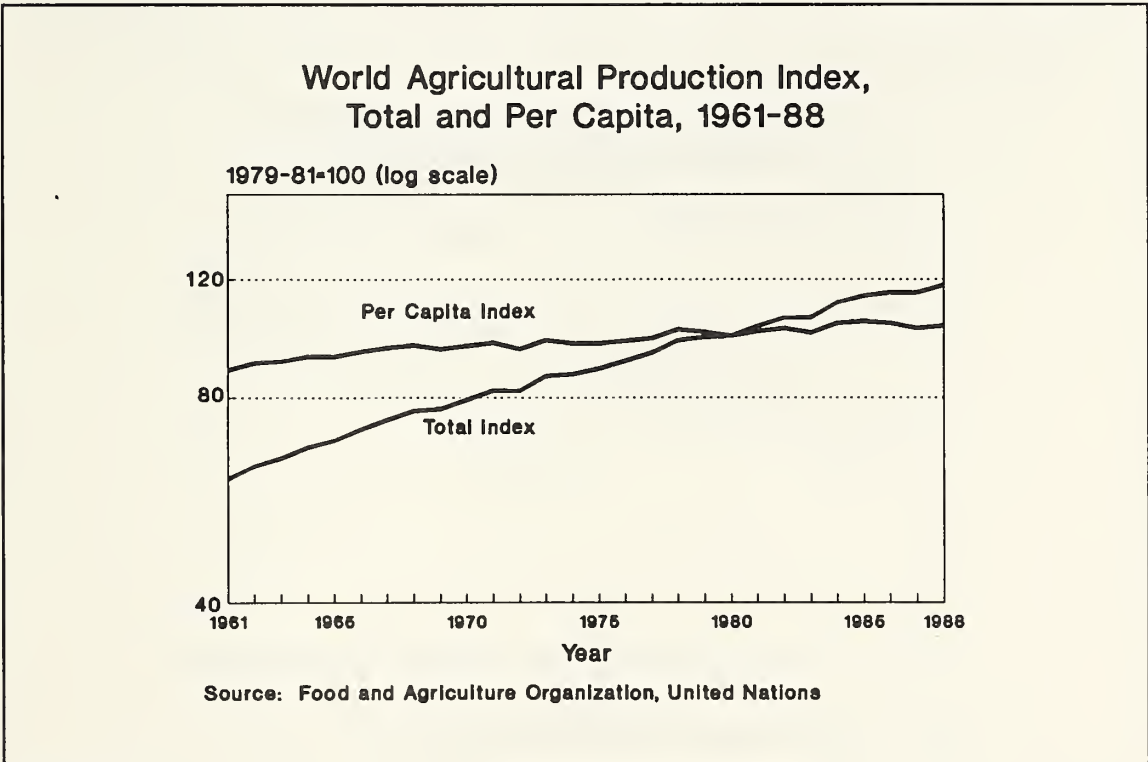


Figure 1

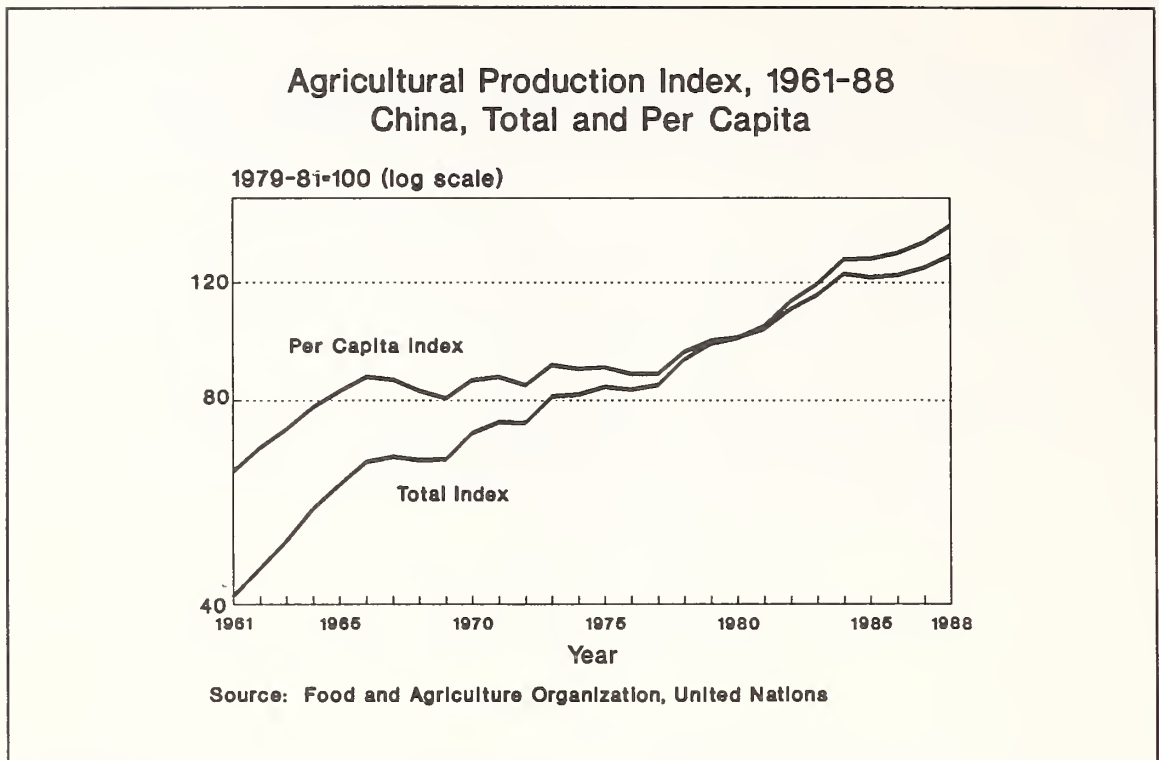


Figure 2

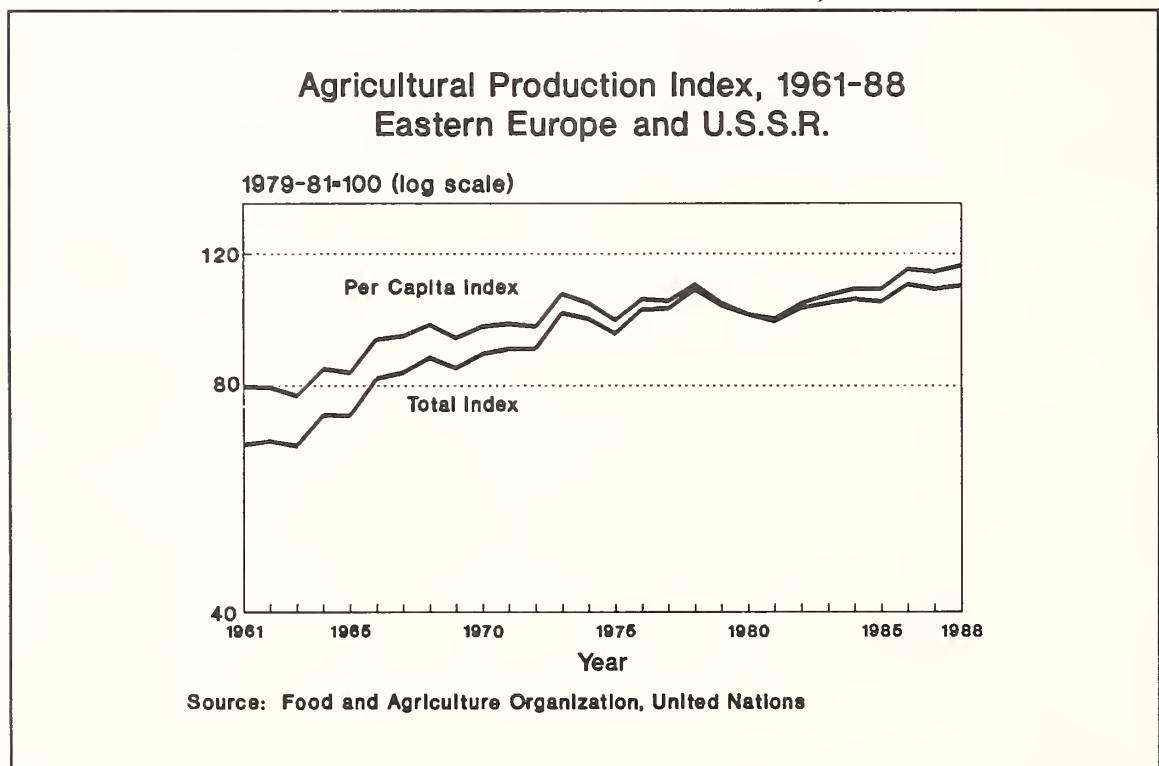
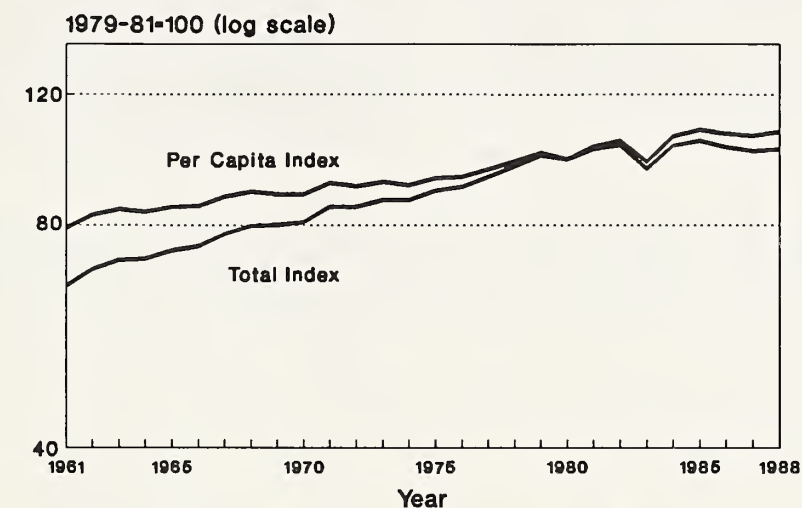


Figure 3

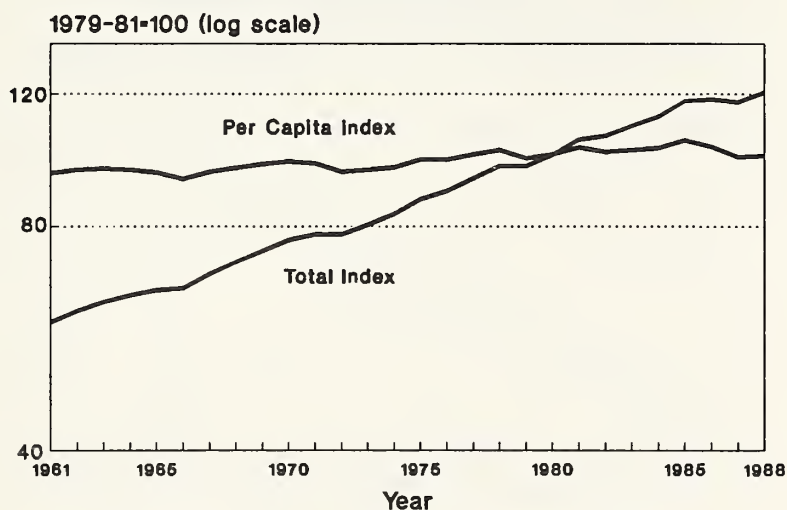
Agricultural Production Index, 1961-88 Developed World, Total and Per Capita



Source: Food and Agriculture Organization, United Nations

Figure 4

Agricultural Production Index, 1961-88 Developing World, Total and Per Capita



Source: Food and Agriculture Organization, United Nations

Figure 5

The data for the past few years reveal a plateau in world agricultural production. The slowdown has been widespread, including both developed and developing countries, as well as China. However, China maintains a healthy, even if slower, rate. Only the centrally planned countries in Eastern Europe and the USSR have exceeded their earlier growth rates during the last three years.

In the United States and the EC the indication of slower growth is attributable to programs to counter the buildup of surpluses. But the U.S. droughts in 1988 and 1989 took the slowdown much further than was intended. Explanations of the slowdown elsewhere come less easily; it remains to be seen whether there has been a break with past trends.

The challenge is whether the world as a whole will maintain the long-term trends in growth of agricultural output per capita. The expansion of cropland is slowing and leading to a significant drop in global per capita cropland availability. Because of the land constraint, technology gains will continue to play an important role in increasing world production. The trade-offs between the environment and food safety and worldwide reliance on technology to maintain production growth constitute one set of developments to watch in the coming decade.

Because of land and other economic constraints on expanded input use, productivity gains play a key role in the growth of world food availability. Figure 6 shows a 59-year history of U.S. farm productivity growth, as measured by an aggregate index of output

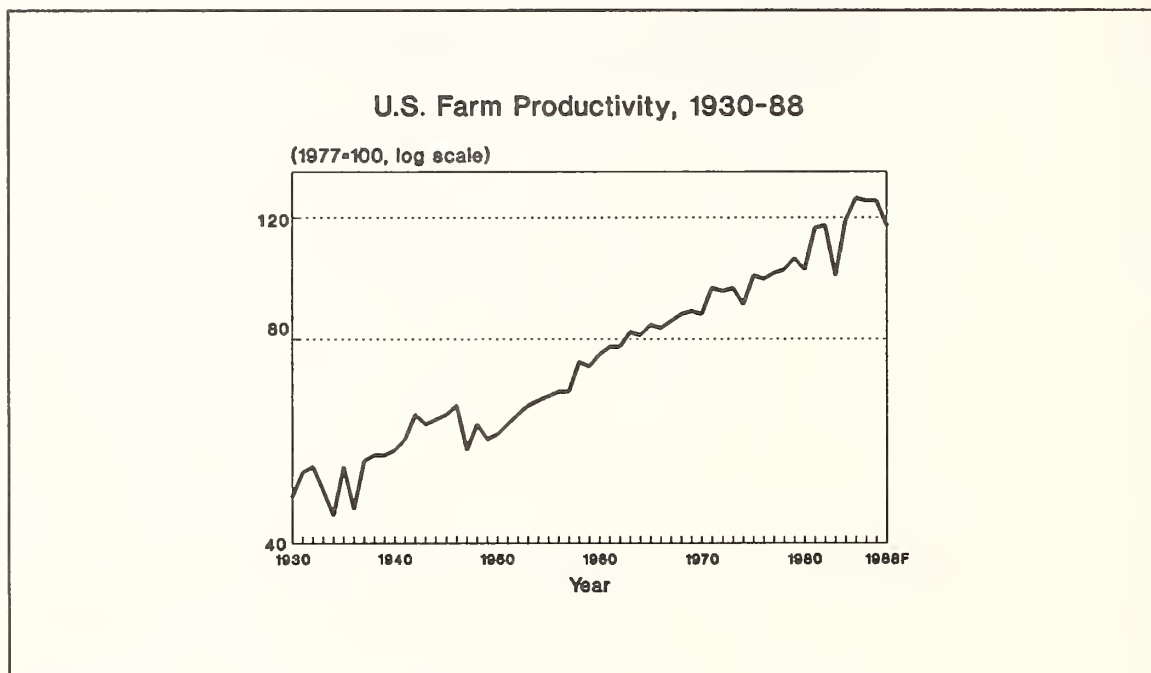


Figure 6

divided by an index of all farm inputs. Plotted on a log scale, a linear trend shows a constant rate of total factor productivity growth.

While U.S. productivity growth fluctuates around the trend line, there is no evidence that the rate of growth is declining in recent years. Although estimates of total factor productivity are scarce for countries outside the United States, studies have been carried out for Canada, India, Indonesia, Japan, South Korea, Pakistan, Taiwan, Thailand, and the U.K. They show similar rates of productivity growth, 1 to 2 percent annually, and similarly do not show signs of a slowdown in recent years.

Let us now turn to the demand side of the world agricultural scene. While total production had been increasing at over 2 percent until the mid-1980's, population growth has been slowing, from 2 percent a year during the 1960's to about 1.6 percent a year currently (Figure 7). Because population had grown less than output, output per person had been increasing until the past few years.

In spite of surpluses being an occasional problem in the developed countries, adequate food production remains a challenge, even with the trend to slower population growth expected to continue. World population is now expanding by nearly 90 million people each year.

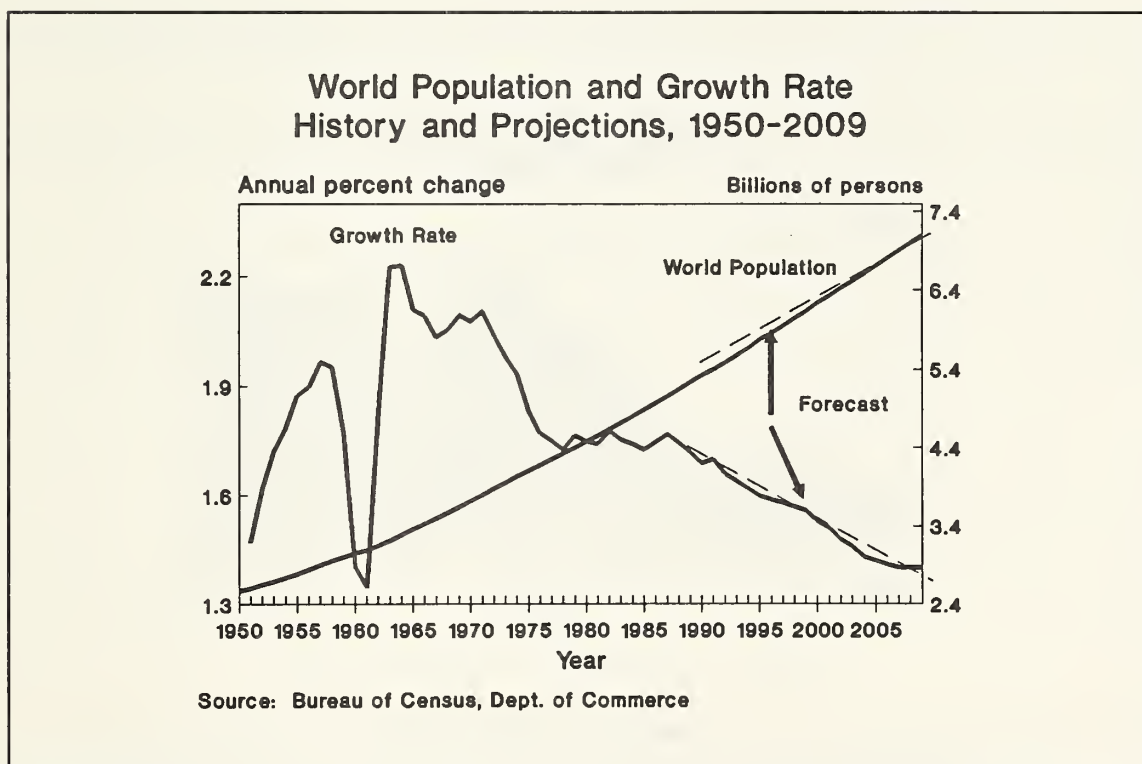


Figure 7

This is equivalent to adding more than one-third of the U.S. population. However, for demand to be increased, we must have income growth.

Domestic demand prospects for U.S. agricultural products in the 1990's can be expected to expand at about the population growth rate. With slow growth in domestic demand, prospects for expansion in U.S. agriculture depend on export demand. So the economic growth behind export demand constitutes a second set of developments to watch in the 1990's.

Figure 8 shows U.S. grain exports to developing countries and the rest of the world. This chart shows that the developing countries have been the growth markets for U.S. exports. The shrinking markets have been in the developed countries while the centrally planned countries have been large and volatile markets. In the 1970's, the developing countries not only expanded their own production, but increased their imports as well. This shift in demand was fed by rapid economic growth and credit. In the 1980's, when economic growth in these countries slowed, and debt payment problems began to accumulate, the growth in imports to the less developed countries stopped growing.

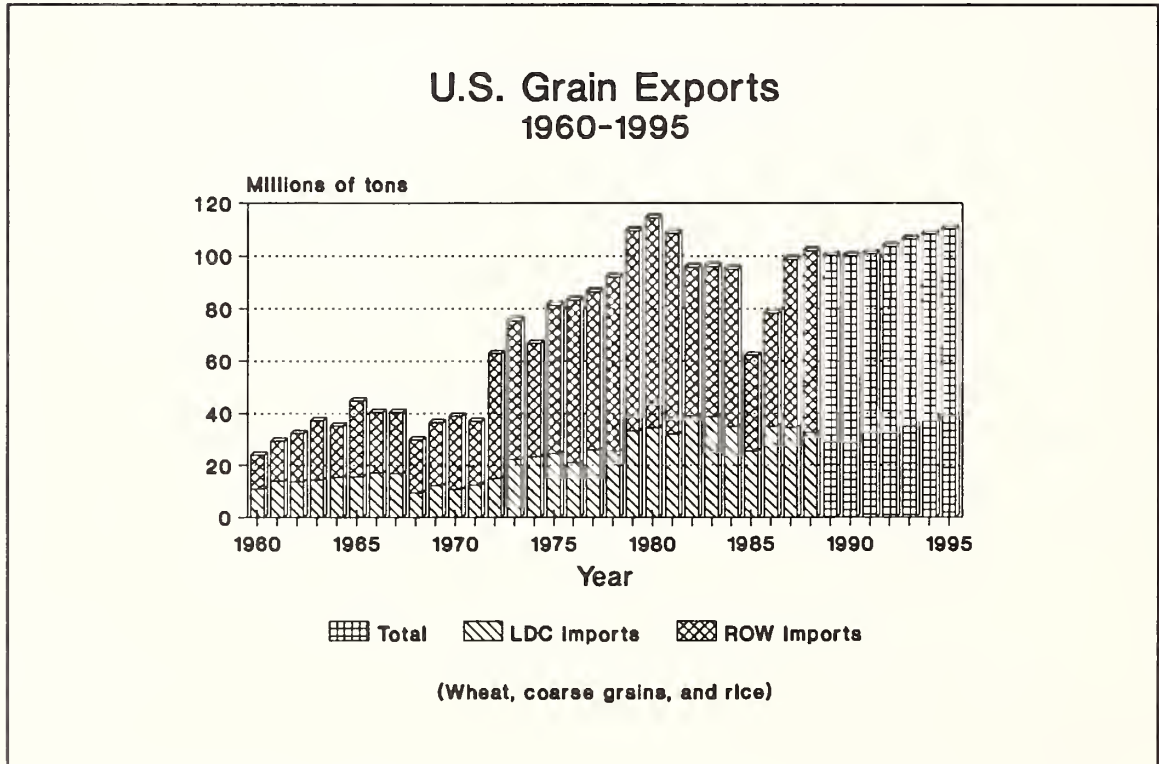


Figure 8

This experience is consistent with the idea that the economic progress of the developing countries and resolution of their debt problems is a critical component of world economic developments and export demand in the 1990's. If the debt problem is resolved, we anticipate improved economic growth for these countries in the coming decade.

In the centrally planned countries, which--including China--account for nearly 30 percent of the world's population, food policy decisions will be as important as economic growth. The impressive record of the Chinese in increasing both total and per capita production still leaves per capita production below the world average, although above the other developing countries, and around a third of per capita production in the centrally planned countries of Eastern Europe and the USSR. Whether or not centrally planned countries will choose to supplement their production with imports will be a policy decision with important implications for exporting countries, including the United States. Thus, centrally planned economies' policy decisions form another set of critical developments in the outlook.

Developed countries are both customers and export competitors for the United States. The main issues here are policy issues. For example, the European Community, formerly an important importer of wheat, has become a major exporter in the 1980's. While economic growth is needed to translate the potential demand in developing countries into effective demand, policy reform is needed in many developed countries, including the United States. The single most helpful development in assuring the United States of expanding export markets in the 1990's would be a successful conclusion to the agricultural trade negotiation in the current GATT round.

An additional factor is the exchange value of the dollar. Our expectation is for a gradual decline, which would improve the U.S. export picture slightly.

Looking more generally to the 1990's, let me summarize the economic prospects with respect to two main issues: first, the worldwide supply/demand balance for agricultural commodities, and second, the competitive position of the United States in world markets.

On the demand side we have population expected to grow more slowly, but income per capita and debt problem resolution making demand per capita grow more rapidly in the 1990's compared to the 1980's. There is no official USDA forecast on how these forces will balance out, but let me state tentatively that the most likely prospect is for overall demand to grow slightly faster in the 1990's than in the 1980's. On the supply side, environmental concerns and expanding non-agricultural uses suggest a slower rate of growth of resource availability to agriculture. But productivity growth is not expected to slow down and may even accelerate slightly in the 1990's. The overall global scenario suggested is that demand will grow slightly faster and supply not much if any faster, comparing the 1990's to the 1980's. This suggests tighter markets in the 1990's, but not necessarily higher prices. Because real prices fell so sharply in the 1980's, the scenario sketched here indicates that prices will not fall as sharply in the 1990's, but not that they will rise.

The long-term data show a clear downward trend in real price, illustrated in Figure 9, for wheat and Figure 10 for prices received by U.S. farmers for the aggregate of all commodities. The real price trend for wheat is a decline of about 1.9 percent per year in

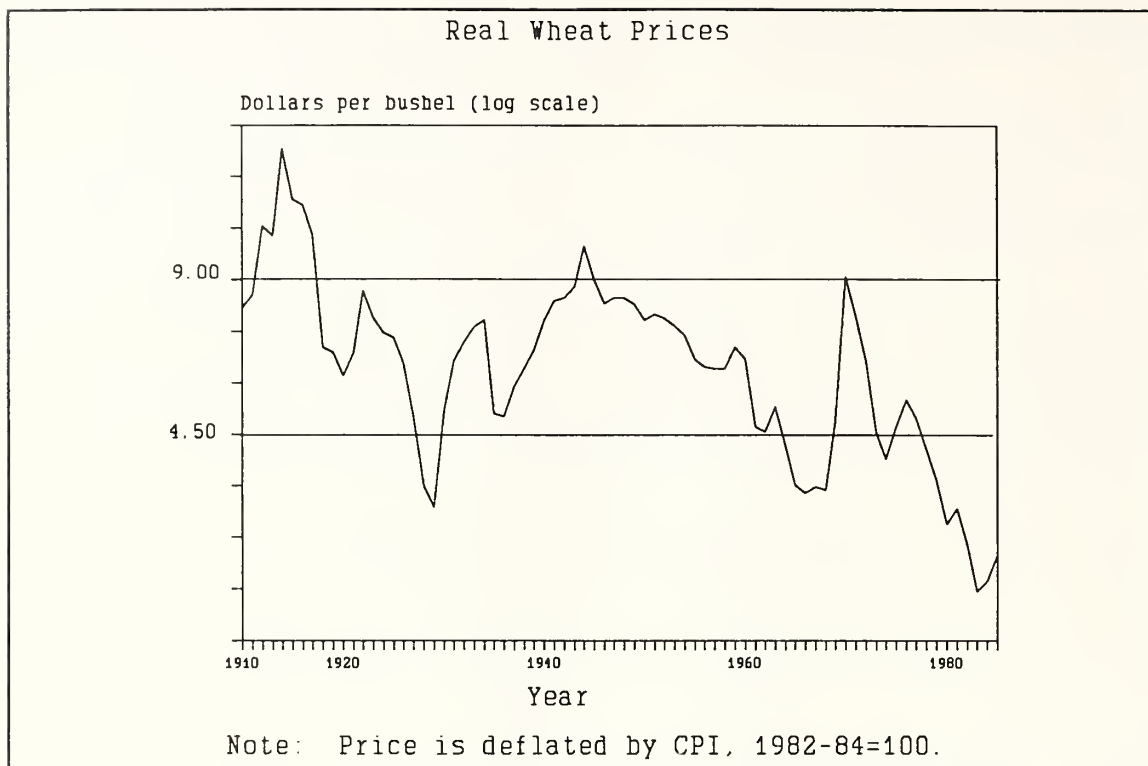


Figure 9

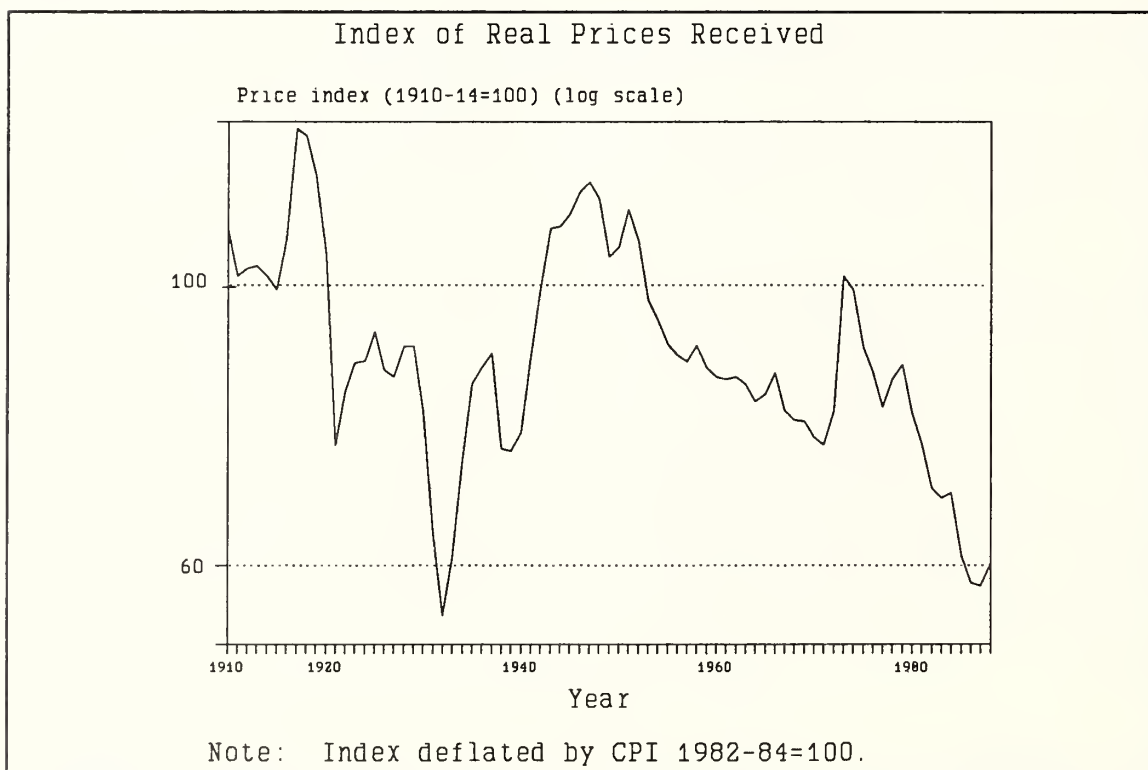


Figure 10

1910-1988. Currently, the wheat price and the prices received index generally are below their long-term trend lines. USDA forecasts for 1990 do not foresee a return to trend prices, but some time in the 1990's it would not be surprising to see a price spurt, fueled by unforeseeable events, that would bring us back to the long-term trend. The likely trigger would be accelerated real income growth on a world scale accompanied by a temporary supply shock.

The U.S. position in terms of competitiveness and hence farm income will depend on our ability to keep productivity on an upward track and costs moving down compared with other countries. A favorable outcome for the United States also would get a strong boost from a level playing field for our exports, which is why the GATT negotiations that Secretary Yeutter, Ambassador Hills, and others have emphasized are so crucial for the 1990's.

In any forecast of the outcome of these events, it would be hard to separate elements of wishes as opposed to evidence, especially when the evidence is so fragmentary. So all I will say is that the potential is there for a prosperous U.S. agriculture in the 1990's, and whether it occurs or not depends largely on the agricultural community in its broadest sense, that is, on us.



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ECONOMIC IMPLICATIONS OF A CHANGING WORLD FOR AGRICULTURE AN AUSTRALIAN PERSPECTIVE

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Throughout the 1980s, rural exports constituted about 37 per cent of Australia's merchandise exports. Although this represents a decline from earlier decades, Australia's trade performance is still more heavily dependent on developments in international agricultural markets than that of most other developed countries. Australian commodity producers therefore take a keen interest in the types of changes likely to occur in agriculture, and in agricultural and trade policies, over the coming decade that may have an impact on either the level or variability of world market prices.

Some of the factors which will affect agriculture in the 1990s have already emerged as major issues over the last few years. These include the macroeconomic imbalances in the world economy, the Uruguay round of multilateral trade negotiations, the indebtedness of developing countries, and developments in Eastern Europe, the European Community and the countries of East Asia and the Pacific. These are discussed in the first part of the paper. There is also a range of other developments which will become of increasing importance in the coming decade and which are likely to persist well into the next century. These include demographic trends (for example, the changes in the age structure of the population in developed countries), consumer concerns with food quality, a range of environmental issues, and developments in biotechnology and new technologies of agricultural production. These longer term issues are discussed in the second part of the paper.

Current Issues

Macroeconomic imbalances

Fiscal and current account imbalances in the US economy have contributed to the current account imbalances in the world economy. The US current account deficit has resulted in the United States changing from the world's largest creditor nation in 1981, with US\$141 billion in net holdings of foreign assets to a net debtor nation by 1984. By 1987, the United States had a debt of US\$368 billion, making it the world's largest debtor. This turnaround in net external asset position reflects the results of a succession of large budget deficits, and

some decline in the savings rate in the private sector. The former, in particular, has been a source of great concern in world financial markets (O'Mara 1988).

The increase in US external debt has been matched by a corresponding rise in the level of foreign assets held by Japan and West Germany (table 1). Many informed analysts project that US debt will level off in the early 1990s not much below US\$1 trillion. This would require a trade surplus of US\$50 billion a year to service, which would mean a dramatic turnaround from the \$116 billion trade deficit expected this fiscal year.

It is probable that the US budget deficit will fall substantially over the next few years, and that this, coupled with adjustments in the private sector, will result in the US current account deficit trending downward without imposing excessively harsh adjustment pressures on the US or international economies. This is the scenario which underlies the Bureau's commodity outlook.

It may, nevertheless, be instructive to consider briefly the implications of an alternative macroeconomic scenario. In particular, financial markets might become dissatisfied with the pace of adjustment of US fiscal policy and the current account balance. In that case, interest rates in the United States would probably rise sharply because a risk premium would be imposed on the interest rate structure and the US dollar would be subject to increased volatility. Higher interest rates could lead to a sharp curtailment of private consumption and investment expenditure, which could produce a marked slowdown in economic activity and a weakening in US import demand in the short term. This would adversely affect economic growth in many other countries.

Table 1: GLOBAL CURRENT ACCOUNT IMBALANCES

Country	Unit	1980	1986	1987	1988	1989(f)	1990(f)
United States	US\$b(a)	1.9	-138.8	-154.0	-135.3	-139.3	-156.6
	%	0.1	-3.3	-3.4	-2.8	-2.7	-2.8
Japan	US\$b	-10.7	85.8	87.0	79.5	84.0	93.5
	%	-1.0	4.3	3.6	2.8	2.7	2.8
Federal Rep. of Germany	US\$b	-13.8	39.3	45.0	48.5	49.7	51.2
	%	-1.7	4.4	4.0	4.0	4.1	3.9
Four Asian NICs	US\$b	-9.0	23.1	30.3	25.8	27.3	25.7
	%	-6.4	10.3	10.8	7.4	6.3	5.4

(a) Percentages show the current account relative to GNP. (f) IMF forecast.

Source: IMF (1989).

Instability in US financial markets could also spread to financial markets in other countries, leading to a widespread decline in confidence and weaker consumption and investment expenditure. This would reinforce the short term effects of sharply weakened import demand in the United States. A weakening in economic activity in several key economies would be likely to lead to a decline in world trade and to put downward pressure on commodity prices. World trade volume in general responds more than proportionately to fluctuations in economic growth (figure 1). It has been estimated that a sustained reduction of 1 percentage

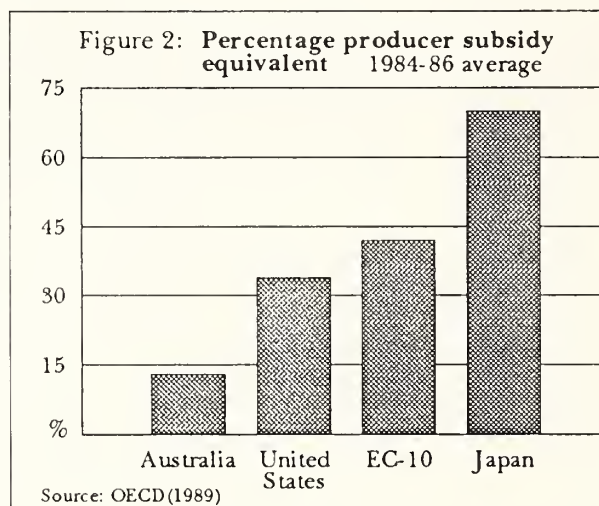
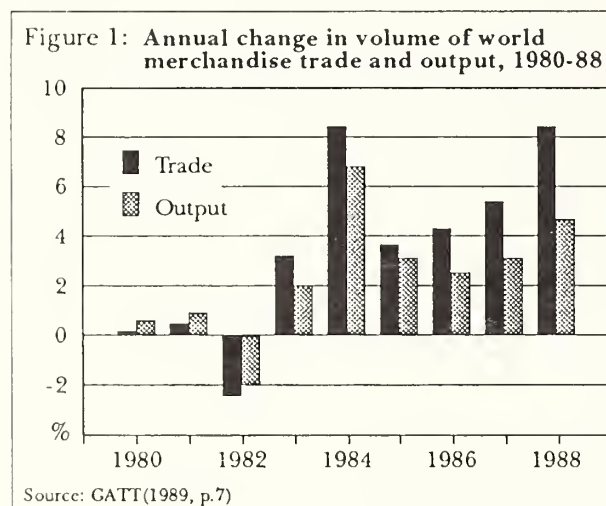
point in the growth rates of OECD countries could lead to a 2-3 per cent fall in primary commodity prices after two years, and a 5-6 per cent decline after five years (OECD 1988).

The Uruguay round and agricultural markets

At the inception of the current round of multilateral trade negotiations - the Uruguay round - a high priority was given to agriculture. This reflected the severity of the problems affecting world agricultural trade in the mid-1980s.

These problems stemmed largely from the effects of reduced imports by the developing countries and the domestic support policies in many developed countries, particularly the European Community, Japan and the United States. In each of these developed economies there are well organised lobbies intent on preserving government financial support for agriculture. In terms of the direct cost to the average taxpayer, the policies concerned may not seem particularly expensive. However, these policies generally lack transparency; they have undesirable intersectoral effects; they tend to be regressive; and in many cases, they do little to achieve their stated objectives. Moreover, for small and medium sized economies dependent on agriculture and forced to adjust to the policies of major economies, the economic effects can be particularly damaging.

Levels of agricultural protection in different countries can be approximately ranked by their producer subsidy equivalents. In the period 1984-86, this measure, calculated for representative commodities (OECD 1989), indicated that producers in the United States, the European Community and Japan received between 35 per cent and 70 per cent of their total receipts as a result of government measures while, by contrast, in Australia these provided only 13 per cent of agricultural receipts (figure 2).



Several studies have simulated the effects which might be associated with agricultural trade liberalisation in developed countries. Findings common to most such studies are that liberalisation would raise world market prices of agricultural commodities and make them less variable. Growth in world agricultural trade would also be stimulated, which in turn would help world economic growth, to the benefit of both the developed and the developing countries.

Many developing countries have domestic policies which effectively tax agriculture. The reform of such policies at the same time, therefore, would allow these countries to benefit more fully from the potentially large world price effects stemming from reduced government intervention in developed countries. Thus, more

efficient allocation of resources in the developing countries could also provide an additional stimulus to global economic growth.

Since there appear to be so many potential benefits associated with agricultural liberalisation, it is perhaps surprising that progress in the Uruguay round has not been more rapid. There are a number of reasons for this:

Many of the countries involved in the negotiations have very different levels of government support of agriculture; this has increased the difficulty of negotiating reductions in support.

Because of the variety of instruments that governments have used in different countries, negotiators have had difficulty in agreeing on methods of measuring assistance or monitoring its reduction.

There is inevitably strong domestic political opposition to change since large and highly visible benefits to farmers, who are relatively few in number, would be replaced by smaller and more diffuse benefits to individual consumers.

The benefits to the economy tend to be long term, whereas in the short term there may be adjustment costs for the industries affected by change.

The higher prices now prevailing in world markets have reduced the short term incentive to reform agricultural support policies in those countries where expenditure on agricultural support had until recently been imposing a strain on budget resources.

Although the food exporting developing countries would gain, those developing countries which depend heavily on food imports would lose access to food at distorted prices. For the latter countries, higher world prices for agricultural commodities could in the longer term stimulate investment in their agricultural sectors (Anderson and Tyers 1989). In addition, they would benefit from any liberalisation of trade in other sectors which might accompany a negotiated reduction in agricultural protection.

The tabling of the US proposal for comprehensive long term agricultural reform in the Negotiating Group on Agriculture, on 25 October 1989, has injected new life into the agricultural negotiations. Australia, together with its Cairns Group partners, has welcomed the US initiative, the general thrust of which is consistent with that in the recently released ABARE monograph on United States grains policies (Roberts, Love, Field and Klijn 1989). Unfortunately, the initial response of the European Community to this initiative was disappointing. Clearly, if material progress is to be achieved in the negotiations over the next twelve months, a major effort by all Uruguay round participants will be needed.

If countries fail to take advantage of the opportunity provided by the Uruguay round to reform agricultural policies, there are a number of likely consequences for agricultural exporting countries, such as Australia, and for the world economy in general. First, since there is a low probability of most countries initiating policy reforms unilaterally - despite the economic gains - it follows that agricultural protection, especially in major developed countries, would continue with consequent adverse effects on world income.

Second, there could be an increasing proliferation of bilateral trade agreements, trading blocs, or both. If internationalist sentiments did not prevail in these trading blocs, the fragmentation of the international trading system would increase.

Third, there might well be a continuance of the confrontationist policies pursued by the United States and other subsidising exporters, which contributed to the sharp downward spiral in world market prices for

agricultural commodities - especially wheat - in the mid-1980s, and which adversely affected not only the major protagonists (the United States and the European Community) but also other trading nations such as Australia and Argentina.

If the Uruguay round negotiations do eventually prove successful in removing or reducing the most distortionary barriers to agricultural trade, there also needs to be a general realisation and acceptance by participating countries of the advantages of free (or freer) trade. Otherwise, there could be increased recourse to other, less obvious, barriers to trade which hitherto have been relatively little used. Such barriers may take the form of 'health' regulations, for example. Such restrictions could be even more difficult to remove through negotiation than the tariff and non-tariff restrictions which previously existed.

Developing country debt

Economic performance in the 1980s has varied widely among developing countries. In parts of Asia economic growth has been faster than in earlier decades, while in some parts of Africa and South America real income per person has declined to less than it was ten years ago. The reduced availability of foreign capital for investment, reflecting concerns by international creditors about the existing stock of debt, has been one of the most important factors explaining the decline in economic growth in African and South American countries (International Monetary Fund 1988). Accompanying the overall decline in economic growth of the developing countries has been a slowing in the rate of growth of trade, especially in the value of imports of food commodities by these countries (table 2). Growth in the value of food exports by developing countries has also slowed in the 1980s, mainly reflecting the relatively low level of food prices on world markets over much of the period.

Though the prospects for growth in the developing countries in the 1990s will depend primarily on their own actions, developed countries can influence the economic environment in which developing countries operate. In particular, the level of Third World debt repayments will be affected by both the macroeconomic policies pursued in major developed countries, through their effect on world interest rates, and the moves undertaken by developed countries to directly reduce Third World debt. Given the higher income elasticities of demand for food in developing countries compared with developed countries, international commodity prices could

Table 2: ANNUAL GROWTH OF FOOD TRADE OF DEVELOPING COUNTRIES: 1974 to 1986

Country group	Imports		Exports	
	1974-80	1981-86	1974-80	1981-
86				
	%	%	%	%
All developing countries	10.0	1.5	2.7	1.6
Asia	7.3	3.7	6.5	6.0
Middle East	13.6	3.2	2.7	-0.2
Latin America	10.7	-3.5	3.5	0.3
Africa	10.5	1.7	-2.9	-0.1
Other developing countries	5.8	3.0	6.7	0.3

Source: Based on FAO (1987).

be expected to improve should part or all of the existing Third World debt be written off by the developed countries. For example, a recent ABARE model simulation indicated that, for a range of temperate zone commodities, world prices could increase by 1-8 per cent following a write-off of debt in most developing countries (Gunasekera, Bowen and Andrews 1989).

Developments in Eastern Europe

The centrally planned economies of Europe directly influence world trade, economic activity and growth. Eastern Europe alone comprises 100 million people, providing enormous demand potential as incomes grow. Australia's traditional exports to Eastern Europe are predominantly raw materials such as cattle hides, wool and coal, but processed food and timber may offer new export opportunities. New policy developments in these economies could therefore be one of the major features of the 1990s for Australia and for other agricultural exporters.

Although governments in many of the centrally planned economies have recognised the need for economic reform, they face a formidable challenge in moving toward decentralised decision making and greater reliance on markets. In these economies, just as in market economies, there are powerful vested interests prepared to oppose new policies which will result in changes to established positions.

Some of the countries of Eastern Europe - particularly Poland, Hungary and East Germany - have made major steps toward political reform, but further microeconomic reforms appear necessary if the full growth potential of these economies is to be realised. A number of the countries of Eastern Europe - for example, Yugoslavia - have high levels of foreign debt. The repayment of this debt restricts the policy choices available to these countries, and may therefore be a constraint on future growth. The Bureau currently assumes for the purpose of its commodity analysis that annual economic growth in Eastern Europe will be 2.5-3.0 per cent until the mid-1990s. These assumed growth rates could be altered by, on the one hand, increased foreign investment in Eastern Europe and rapid microeconomic reform, or on the other, the loss of significant amounts of human capital from these countries through migration.

It is too early to evaluate the reforms so far decided upon in the Soviet Union. Much will depend on the acceptance of new policies at the regional or local level. Obviously the implications of the changes resulting from such reforms could be immense if they are well designed and prove to be long lasting.

Developments in the European Community

In the 1990s, the effects on budgetary funding and production levels of the entry of Spain and Portugal into the European Community will come to be fully felt. In aggregate terms, these two members have increased EC land area by around one-third and the labour force by approximately one-quarter. In view of the relative importance of the agricultural sectors in both these countries, in terms of employment and potential output, their accession can be expected to lead to increased calls for more structural funds and higher levels of support for southern European agricultural products.

The agreement (termed Europe 1992) between the twelve European Community member countries to complete the Common Market can also be expected to be an influence on world trade generally in the 1990s. The EC Commission has estimated that if the common market is completed successfully by 1992 there could be a significant improvement in output and employment in the European Community.

It is still too early to assess whether such a development will be beneficial or detrimental to the Community's trading partners, as the final form of changes to be made to many internal trade barriers is still undecided. It

is also uncertain whether all the proposals will be implemented by the 1992 deadline. From an agricultural exporter's viewpoint, Australia is particularly interested in whether proposals to remove frontier controls are implemented, as their removal could lead to changes in the way the agri-monetary system operates. In particular, the monetary compensations which have been used to frustrate price restraint in the Community would be difficult to administer effectively in the absence of border controls.

The countries of East Asia and the Pacific

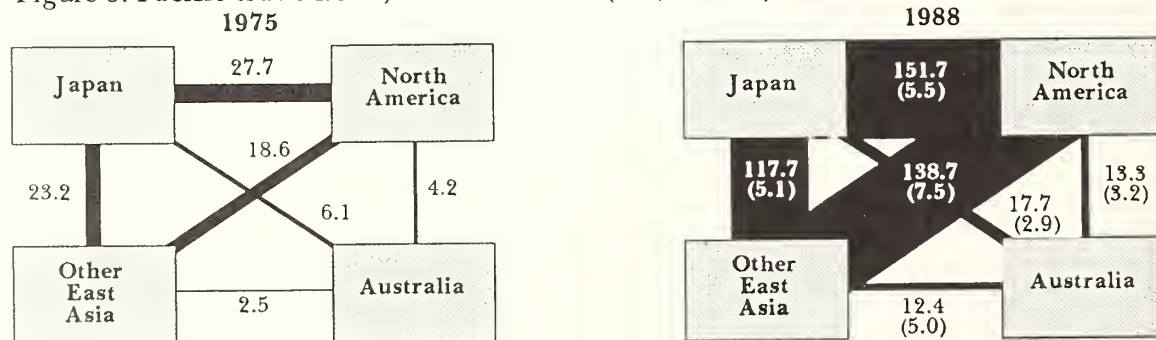
The economies of East Asia and the Pacific will continue to play a major role in world economic development during the remainder of this century. The strong economic performance of Korea and Taiwan over the last ten years has transformed them into major surplus nations. Taiwan's current account surplus reached US\$9.3 billion at the end of 1988, while Korea's was US\$14.3 billion. These figures appear relatively small in comparison with Japan's US\$78 billion surplus in the same year. However, as recently as 1983, Japan's surplus stood at US\$20.8 billion - less than the combined surplus for Korea and Taiwan in 1988.

Although concerns have been expressed about these current account surpluses, it is probably a natural part of the development process that they should be increasing as these countries emerge from 'newly industrialising' status (Onitsuka 1974; World Bank 1985). It is probable that current account surpluses will persist until well into the 1990s or beyond, but eventually these are likely to correct themselves as the economies mature. The implication of this view is that the pressure being placed on these countries to change policies to reduce their current account surpluses may be inappropriate in the short to medium term and unnecessary over the long term.

The exceptional growth of China has also been a feature of the region's performance, and in the coming decade the growth of other countries in the region - including Thailand and Malaysia, both of which are trying to diversify their economies away from heavy dependence on primary products - may prove no less impressive, although it needs to be recognised that the countries of the region are diverse in terms of their economic, resource, political and cultural characteristics (Table 3).

The trade of the East Asian and Pacific countries has grown more rapidly than world trade in general. The share of world exports originating from the newly industrialising countries - Hong Kong, Taiwan, Korea and Singapore - more than doubled between 1980 and 1988, while the shares held by China and Thailand both increased by over 65 per cent (Asian Development Bank 1989, p.189). The rate of growth of exports from these and other countries in East Asia and the Pacific basin might have been even higher had not other countries discriminated against their exports by imposing anti-dumping and countervailing duties, and rules on origin and local content.

Figure 3: Pacific trade flows, 1975 and 1988 (US\$ billion)



Note : Figures in brackets show 1988 levels as multiples of 1975 levels.

Table 3: CHARACTERISTICS OF EAST ASIAN AND PACIFIC ECONOMIES

Country	Population 1987	Forecast population growth rate (1987-2000)	GNP 1987	GNP per person 1987	GDP growth rate		
					1988	1989	1990
	million	% per year	US\$'b	US\$	%	%	%
Japan	122.1	0.4	1 924.2	15 760	5.6	4.5	4.0
Republic of Korea	42.1	1.0	113.2	2 690	11.0	7.6	6.7
Taiwan	19.8	na	120.9	4 812	6.8	6.2	6.5
Singapore	2.6	0.8	20.6	7 940	11.1	7.5	6.0
Hong Kong	5.6	1.0	45.1	8 070	7.4	6.0	4.5
Thailand	53.6	1.5	47.5	850	11.0	8.0	7.5
Philippines	58.4	1.9	34.4	590	6.6	6.3	5.4
Indonesia	171.4	1.7	69.7	450	4.7	5.1	4.8
Malaysia	16.5	2.2	31.9	1 810	7.8	6.5	6.0
China	1 068.0	1.3	309.7	290	11.2	8.0	9.0
Vietnam	65.0	na	na	na	5.8	5.6	6.5

Sources: World Bank (1989); Asian Development Bank (1989, p.178)

A second feature of these countries is the rapid growth in intra region trade. Figure 3 shows that, between 1975 and 1988, trade between Japan and other East Asian economies (the newly industrialising countries, China and the member countries of the Association of South-East Asian Nations) increased by a factor of five, while world trade increased by about 230 per cent. Trade between Australia and other East Asian countries was also about five times as high in 1988 as in 1975, while trade between Australia and Japan was about three times as high (Drysedale, Viviani, Watanabe and Yamazawa 1989).

Developments in the region have a number of important implications for agricultural markets. Following recent policy changes in Japan, access to that market should improve, providing opportunities for agricultural exporting countries, not only in commodities such as cereals and livestock products but also in high valued horticultural products including speciality fruits and vegetables. In Korea and Taiwan also, market opportunities for agricultural products should expand as domestic reforms reduce government protection of agriculture.

Thailand and Malaysia - regarded by many observers as being the two economies most likely to emulate the growth performance of Korea and Taiwan in the coming decade - are relatively rich in natural resources compared with Japan, Korea and Taiwan. However, they generally do not have a comparative advantage in beef and feed grain products. As the consumption of livestock products can be expected to increase in these countries as incomes rise, it seems likely that opportunities will emerge in both markets.

Developments in China and in the other major centrally planned economy in the Asian region - Vietnam - are clearly of importance to Australia. Both countries have large populations and both have considerable potential for economic growth. The performance of China prior to the recent political instability demonstrates this potential. The reform of agriculture, the opening of the economy to foreign trade, technology, and investment, and the new reliance on incentives in the industrial sector led to an average growth rate of more

than 10 per cent a year in China during the 1980s. However, serious imbalances were created in the economy, such as a high inflation rate caused partly by a too rapid expansion of domestic credit, and a growing balance of trade deficit. China's annual growth rate to the mid-1990s is assumed by the Bureau to be 6-7 per cent, as against 3.0 per cent for the OECD countries and 3.2-3.4 per cent for the world economy.

Australia's interests in the region are direct; 59 per cent of Australia's merchandise exports went to the countries of East Asia and the Pacific in the period 1985-87, compared with 53 per cent 20 years earlier. The region is an important destination for Australia's rural exports, accounting for 52 per cent of their value in the most recent period and 47 per cent in the earlier period. The growth in this market contrasts with the decline in the share of the European Community and the United Kingdom. In 1965-67, these markets took 34 per cent of Australia's rural exports, compared with only 13 per cent 20 years later (Figure 4). Japan, Korea, Taiwan and China are particularly important markets for commodities such as wool, beef and cereals. The trade tension between the United States and the European Community on one side and Japan, Korea and Taiwan on the other is therefore an important issue from Australia's point of view. Any move to resolve imbalances between these countries by strategic trade policy or through bilateral agreement (including negotiated target levels for trade with individual trading partners) could be very damaging to third countries such as Australia, as well as limiting the growth prospects for the world economy.

Australia has recently proposed that a regional forum be established to assist economic co-operation in the Pacific Basin. The intention of the proposal is not to create a new Asia-Pacific trade bloc, but to complement and support existing intergovernmental channels such as the Association of South-East Asian Nations (ASEAN), the Pacific Economic Cooperation Conference and the Pacific Basin Economic Council.

The main benefits from such a regional forum are, first, that it should facilitate further trade liberalisation within the region in an open and non-discriminatory way; second, it should help project and protect regional interests in wider economic forums and negotiations; and third, it would provide an opportunity for the open discussion of differences. The establishment of the forum should therefore be beneficial to Australia's export oriented rural sector, as well as to the Australian economy generally.

Longer Term Issues

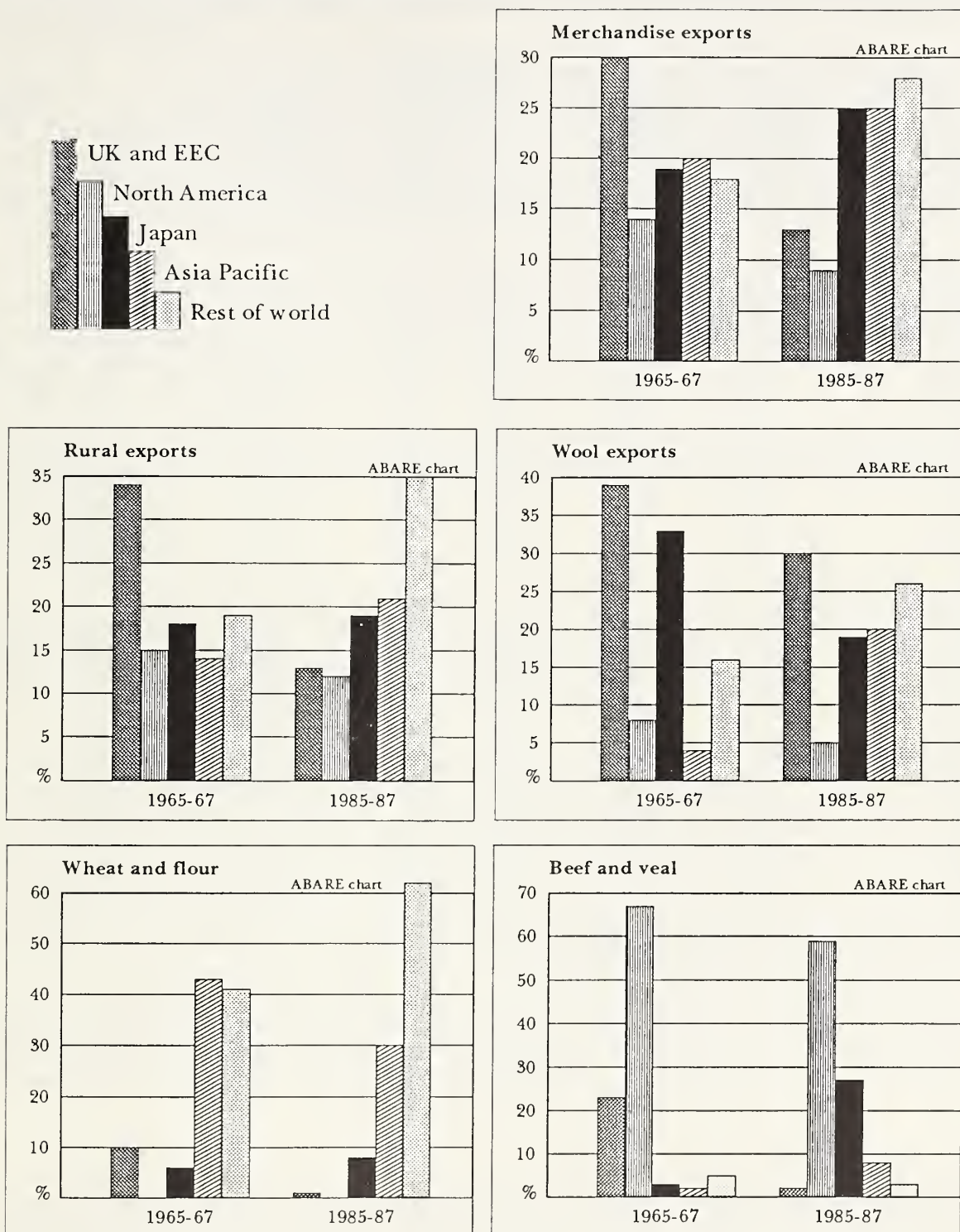
Population changes

Rapid population growth in developing countries has been a major source of the large increase in aggregate demand for food and fibre products in the past. Over the last two decades, for example, population in developing countries grew at around 2.25 per cent a year, compared with 1.28 per cent for the developed countries (United Nations 1986). Population growth in both the developing and developed countries is expected to slow over the next decade to around 2.0 and 0.6 per cent a year, respectively.

By combining these population growth forecasts with forecasts of income growth, and making a series of plausible assumptions about prices and elasticities (that is, the responsiveness of demand to changes in prices and income), it is possible to project growth in aggregate demand for agricultural commodities. The estimates (Table 4) show that demand growth is much higher in the developing economies than in the developed economies. In developing economies, consumers spend a much higher proportion of their income on food, and a higher proportion of any increase in income goes on food, than in developed economies. Also, demand is more responsive to changes in agricultural prices in developing economies.

This analysis has not taken into account all factors which might influence demand. For example, the decline in population growth rates will be associated with an overall ageing of the population. This will be a pervasive force, affecting labour markets, the rate of savings and capital accumulation and the structure of demand,

Figure 4: Destination of Australian exports



Source: Harris (1989)

Table 4: GROWTH IN AGGREGATE DEMAND FOR AGRICULTURAL COMMODITIES (a)

Year	Growth in income per person	Income elasticity of demand	Agricultural price change: alternative assumptions		Agricultural price elasticity of demand	Population growth	Aggregate demand	
			(1)	(2)			(1)	(2)
	%	%	%	%	%	%		
Developing countries								
1990	0.4	0.8	0.0	-1.0	-0.9	2.2	2.5	3.4
1991	0.5	0.8	0.0	-1.0	-0.9	2.2	2.6	3.5
1992	1.1	0.8	0.0	-1.0	-0.9	2.1	3.0	3.9
1993	1.2	0.8	0.0	-1.0	-0.9	2.2	3.2	4.1
1994	1.7	0.8	0.0	-1.0	-0.9	2.2	3.6	4.5
1995	1.8	0.8	0.0	-1.0	-0.9	2.1	3.5	4.4
1996	1.9	0.7	0.0	-1.0	-0.9	2.0	3.3	4.2
1997	1.9	0.7	0.0	-1.0	-0.9	2.0	3.3	4.2
1998	1.9	0.7	0.0	-1.0	-0.9	2.0	3.3	4.2
1999	1.9	0.7	0.0	-1.0	-0.9	2.0	3.3	4.2
2000	1.9	0.7	0.0	-1.0	-0.9	2.0	3.3	4.2
Developed countries								
1990	2.0	0.15	0.0	-1.0	-0.2	0.6	0.9	1.1
1991	2.5	0.15	0.0	-1.0	-0.2	0.5	0.9	1.1
1992	2.4	0.15	0.0	-1.0	-0.2	0.6	1.0	1.2
1993	2.4	0.15	0.0	-1.0	-0.2	0.6	1.0	1.2
1994	2.4	0.15	0.0	-1.0	-0.2	0.6	1.0	1.2
1995	2.5	0.15	0.0	-1.0	-0.2	0.5	0.9	1.1
1996	2.4	0.15	0.0	-1.0	-0.2	0.6	1.0	1.2
1997	2.5	0.15	0.0	-1.0	-0.2	0.5	0.9	1.1
1998	2.4	0.15	0.0	-1.0	-0.2	0.6	1.0	1.2
1999	2.5	0.15	0.0	-1.0	-0.2	0.5	0.9	1.1
2000	2.5	0.15	0.0	-1.0	-0.2	0.5	0.9	1.1

(a) Assuming no change in real non-agricultural prices.

including the demand for food. People over sixty years of age spend declining declining amounts on food because of income and lower physical activity (Schrimper 1985; Bartley 1986). The projected ageing of the Australian population could decrease by 8 per cent average expenditure on meat per adult by 2001 (Bartley 1986). To the extent that similar effects are experienced in other countries, the change in age structure could be an important influence on agricultural markets into the next century.

Consumer preferences

In the middle income developing countries, diet diversification toward livestock products, vegetable oils, sugar, fruit and vegetables can be expected to continue. Part of this change in diet is due to rising incomes,

since in general the share of staple commodities in consumers' expenditure on food tends to decline as incomes rise. But changes in consumer attitudes and social conditions will also influence the consumption of agricultural commodities.

Urbanisation, combined with changing social attitudes and an increase in the opportunity cost of time, are expected to be increasingly important influences on food consumption. These changes have favoured a shift toward processed wheat and meat products and away from traditional unprocessed cereals such as rice and maize. Increasingly, the food purchased by consumers will have additional services embodied in it. Until now this phenomenon has been largely restricted to the high income countries, where time is highly valued. However, with rising incomes additional services, such as packaging and preparation, associated with food products will become increasingly important in the newly industrialising countries.

In the developed countries there has been a growing trend toward the adoption of a healthier lifestyle, including some modification of eating habits. There is also increasing concern about the cumulative effects of pesticide residues in food and possible adverse effects on food safety and human health of some food additives and of water and air pollution. In the longer term these concerns may slightly alter food consumption patterns and/or production methods and techniques.

Increasing consumer concern about food quality opens the door to the use of health restrictions to limit imports. On the other hand, it may also provide niche market opportunities particularly for those countries with extensive agriculture.

Environmental issues

In some countries, stricter environmental regulation may result in a loss of competitiveness in international markets for the industries affected. Governments may introduce policies such as penalty taxes to encourage farmers to use fewer chemical inputs, or farmers may face litigation from consumers. This will require improved management skills on the part of farmers to ensure the maintenance of production levels. Pressure could come from these industries for protection or government assistance.

In many countries, present forms of government intervention can accentuate environmental problems such as groundwater contamination, soil erosion and chemical residues by encouraging farmers to increase production intensity. This effect has caused some governments to alter agricultural policies. In the European Community, for example, there is now greater recognition of the consequences for the environment of the intensive form of agriculture encouraged by CAP policies. This has led to the Single European Act formally requiring that environmental protection requirements be a component of the Community's other policies (Avery 1988). Already limitations have been placed on intensity of livestock holdings in parts of the Netherlands, and on intensity of production in Denmark. Deterioration of water quality is likely to become an issue in Britain as well, because in certain regions (for example East Anglia, the main cereal and root crop producing area) the quality of water supplies does not satisfy minimum EC standards. It is feasible that continued deterioration of water and soil quality could result in changes in CAP policies and impose a limit on production levels for some commodities. To date, it appears that further regulation, rather than a 'first best' solution of removal of input subsidies, has been the chosen policy response to the pollution problem arising as a result of the intense use of agricultural inputs.

In Australia, groundwater salinity, soil erosion and the preservation of natural forests have emerged as important environmental issues for the 1990s. 'Sustainable development' has been proposed as a guiding principle for managing natural resources (see World Commission on Environment and Development 1987). While the precise meaning of 'sustainable development' has not yet been universally agreed, it is clear that it entails a view of environmental objectives and economic growth as mutually compatible rather than

necessarily conflicting. For example, the costs of ensuring continued economic growth in the developing countries, which affects such factors as genetic diversity and the environment's natural carrying capacities, need to be balanced against the benefits flowing from that growth. It may be necessary to reorganise institutional arrangements and incentive structures to ensure that the socially optimal use of resources is sought within a framework which incorporates the explicit and implicit costs and benefits of both economic activity and environmental preservation.

Biotechnology

Biotechnology is certain to become a major issue in the 1990s. New products ranging from genetically engineered animals to soil dwelling microbes giving insecticidal properties to the soil have the potential to alter agricultural markets dramatically. Work underway to alter the size of livestock, increase the resistance of plants and animals to disease, speed up the production process and develop animals that are leaner and require less feed could change the competitive positions of agricultural producing countries.

Policy makers will be faced with important regulatory questions, concerning safety standards and property rights in genetically engineered material. The safety issue will be particularly important, because once a new technology is introduced into management practices, both farmers and manufacturers have a financial interest in maintaining its availability.

The issue of property rights is also important. Intellectual property protection is likely to be an important influence on the level of investment firms are prepared to make in the commercial development of biotechnology. This is one reason efforts have been made to bring the protection of intellectual property within the GATT mandate in the Uruguay round.

Human health considerations - an issue raised earlier, in the discussion of consumer preferences - could be used as an argument to prevent the import of genetically altered material. Socioeconomic and ethical considerations may also become criteria for prohibiting the access of products produced through the use of biotechnology. Public awareness and education programs, therefore, are likely to play a major part in enabling the potential of biotechnology to be realised.

Concluding Comments

The coming decade offers many economic opportunities. Growth in the newly industrialising countries and in the centrally planned economies provides scope for maintaining a satisfactory rate of world growth and development, while new technologies present opportunities for further growth in productivity and improved living standards. Increased integration of the world economy, facilitated by increased trade flows and capital movements between countries, can improve the efficiency of use of the world's resources.

This improvement will not occur automatically. There are dangers that should the Uruguay round fail to deliver substantial trade reform, bilateralism may displace multilateralism as the cornerstone of the international trading system. Should this occur, small and medium sized economies could feel pressure to seek solutions in closed trading blocs, adding further to the fragmentation of the international trading system.

Resolution of the problem of developing country debt would remove a potential source of economic instability from the world scene. However, should there be moves toward bilateralism and protectionism, it would become more difficult for indebted countries to resolve their debt problem, since they would be denied access to free and growing international markets.

Environmental and technological change will present policy makers with many difficult issues during the coming decade. Differences in regulations between countries may alter competitive positions in world markets. Also, in relation to environmental and technological issues there is a wide variety of interest groups - including consumers, animal welfare activists, environmentalists and drug companies - wishing to exert influence over policy makers. These influences could alter markedly the focus of world agricultural policy away from the existing emphasis on support and regulation, toward broader environmental or quality of life measures.

The economies of the Asian Pacific region are experiencing significant economic growth and structural change. Rapid income growth has changed the composition of diets away from traditional foods such as rice toward livestock products. This economic growth is likely to continue, creating increased opportunities for the export of livestock products, feed grains and horticultural products. As a low cost producer of such products, Australia is well placed to continue to remain a major supplier of agricultural products to these markets.

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ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
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Outlook '90, Session 24

For Release: Thursday, November 30, 1989

FINDING VIABLE SOLUTIONS TO AGRICULTURE'S FOOD SAFETY AND ENVIRONMENTAL CHALLENGES

Jack C. Parnell
Deputy Secretary of Agriculture

I want you to know up front that I'm not an expert on any deep and intellectual subject--but I do enjoy sharing my thoughts and ideas on this great industry of ours.

I have had a life long love affair with agriculture--40 years starting on my father's dairy, raising pears, cherries, pumpkins, apples and cattle. There is change taking place--and the status quo is not good enough in this era of transition. We cannot let our intellectual resources erode, least they be blown away by the shifting winds of ill-advised popular opinion.

May God give us the courage to call attention to the changes that are shaping our industry--then to set priorities, and then seek to solve our problems, as a united and forward-looking industry.

Today I hope to challenge you to look with me at the agriculture industry with a much broader perspective and to encourage you to work above and beyond your own known abilities so that you and I, working together, can be better prepared to meet the challenges of a very complex, competitive future.

United States agriculture is the envy of the world--and you have a key role to play in its future.

I want to spend some quality time with you today on food safety. As a consumer, as a parent and as a grandparent, I deeply care about the safety of America's food supply.

Right now, as we speak, there are those who seek to tear down and destroy--by quoting half-truths and pseudo-science. The largest most productive economic engine in the world today is American agriculture.

There is a proverb that says --

"He who has food on the table may have many problems--he who has none has only one."

Look back over the past 25 years. Improved farming techniques have been five times more important in raising production than expansion in land area being farmed. We are running out of land, we are not running out of science!

We should applaud science and chemistry for what they have given us to enjoy. It took until 1950 to populate the earth with 2.5 billion people. Then by mid-1987, we had added the next 2.5 billion in less than 40 years.

Right now there are over 5 billion of us! Even though birth rates have slowed significantly, it will still be some time before population growth stabilizes. The earth's population now jumps by almost a billion people every decade. That's about one more China or India to feed every 10 years!

By the year 2025, there will be over 8 billion of us competing for the same limited basket of natural resources. Only by the rational application of knowledge and science, combined with rational economic and environmental decisions, can we multiply those resources to the level that will soon be needed. We will need everything that agri-chemistry, biotechnology and modern science can offer.

My economic research people tell me that around this globe that the best farm land is already being farmed. There simply isn't a lot of new acreage left. Let's boldly point out to the detractors of scientific agriculture that you cannot limit both land and productivity. We cannot close our minds to the tools that new technology will provide without seriously impairing America's comparative advantage in agriculture, and without seriously limiting the global food supply.

If we turn our backs on scientific agriculture then we turn our backs on our children and our children's children. Future generations will indeed suffer from our lack of vision.

So I challenge you to share your expertise and your belief in science with the agriculture producers of this Nation, the political scientists, the economists, the consumers and the environmentalists.

To do less would surely bring hardship and suffering on many of tomorrow's people. And I ask you to not be afraid of your critics and not be driven to timidity or appeasement by their noise. Let's be proud of our accomplishments of the past and press on to do even better.

Today I challenge the American agri-chemical industry to join with me as a rancher and a farmer, and with the USDA as the farmer's agency in Washington, and with EPA and FDA, and with the responsible environmental groups to work together to improve America's agriculture and America's food supply.

There is always room for one more new idea, for one more set of willing shoulders to shove forward on the wheel of progress, and for positive, intelligent people who want to make a difference, who can improve the best and most reliable food system in the history of the world and make it even better.

Our problem is that today so many of us take for granted our comfortable American life-style that we overlook one important fact: agriculture makes possible (through cheap food) many of the nice things we consider commonplace, but now our familiar environment is changing! There are clouds of misunderstanding on the horizon!

Agriculture is unique. It takes "nothing" and makes "something" out of it, creates new wealth and continues to do that year after year--and still has left all that it started with.

William Jennings Bryan said it best a century ago:

"Burn down your cities and leave the farms alone and your cities will spring up again as if by magic. Allow our farms to be destroyed and there will be grass growing on every city street across America."

Agriculture truly is one of American's greatest success stories. I call it "the greatest story never told."

We may not be perfect, but we're not finished yet. Because of the incredible bounty of our agriculture, Americans are better fed for less money than anywhere else on this planet. We are the cornucopia of the world.

It's time we looked to the strengths of agriculture and build on them with the foresight to weigh the needs of the next 20 years as heavily as we do the problems of today. And we need to answer the question: How can we ensure a safe, affordable and secure supply of food to feed our Nation and other nations in the coming century? We need an intense effort, with clear insight, and a driving unswerving will to win this battle between media hype and quality science. In our world today, merely aspiring to be excellent will prove to be disastrous. We must respond quickly to changing circumstances and be pro-active -- taking advantage of change and not being threatened by it.

Just 50 years ago, our country's agriculture was very different from today. Fifty years ago, the average American spent 22 percent of his disposable income on food, contrasted with 11.8 percent in 1988. This has freed up a lot of resources, enabling the United States to raise its standard of living.

Fifty years ago, a farmer considered 30 bushels of corn to be a very good yield. Today 120 bushels is the average! The average dairyman five decades ago produced 4,787 pounds of milk per cow. Today, it's 13,786 pounds per cow.

Finally, in 1947 a farmer could feed 12.6 people in the United States and 1.5 people abroad. That's a total of 14 people per farmer. Today, one farmer can feed 76.2 people in the United States and 19.8 people abroad--96 people!

Why has American agriculture been so successful in the past 50 years? The answer includes intensive research and development and the courage to try new technology and techniques such as the use of agri-chemicals.

Today we are in a predicament. Our understanding of what science uncovers is outpaced by the rate at which science discovers it.

Science can now find incredibly small substances. Oftentimes we read about a recent discovery of a chemical or pesticide residue in parts per million or billion or trillion.

Let me illustrate. If you dump one pint of material into the ocean and let it evenly distribute itself around the globe, you will end up with about one-tenth of a part per billion in the water.

Another example: If you take an aspirin and cut it into six equal pieces, and then dissolve one of those pieces in a railroad tank car of water, you will have one part per billion. Now, if you drink that water--it's a very clean railroad car--at the rate of two quarts per day, and that's your recommended eight glasses, it will take you 88 years to consume that one-sixth of the aspirin.

New technology is taking us further than we ever thought possible. We now can detect parts per trillion in a glass of water. I applaud science for this tool; however, we simply don't fully understand yet what it means to ingest one part per trillion of a particular residue over the span of 70 years in terms of human health. Is the trace element safe? Is it relevant?

Our concern should be that we don't allow policy to move ahead of science! Or, to put it another way: don't let policy move ahead of common sense!

Some of our detractors say do away with the chemicals until we can figure it out. That's like throwing "the baby out with the bath water!" We need to let science work in an environment which is not full of media hype, and interference.

It is important that the public understand that "zero risk," while politically prudent and attractive is not attainable. But my friend, Dr. Young coined a phrase that I quote frequently these days: biological zero risk. Biological zero risk is attainable, and we are dedicated to attaining it in our food supply.

The Department is committed to a safe and wholesome food supply. If sound scientific reasoning indicates a chemical should be taken off the market, I think all of us should stand together to make sur that it is taken off, and quickly.

Our critics claim USDA cares only about chemicals and pesticides because they boost profit for farmers and the agri-chemical industry.

Nonsense! We believe that chemicals help create to a large degree the great health of this Nation. How long has it been since you have heard of a contaminated water supply? We don't, because we have chemicals like chlorine to apply. Grain supplies are protected by chemicals. Mycotoxins, that are naturally occurring, many highly carcinogenic, are no longer in our food supply because we have protections against them.

We all have a role to play in the food safety area. The job is very serious. So that when the United States sits down for supper, it should expect a wholesome, nutritious meal--the safest food in the world. This expectation can, and should, continue.

A century ago William Jennings Bryan said this:

"Destiny is not a matter of chance, it's a matter of choice. It's not something to wait for--it's something to work for."

I ask you today: What will our destiny be?

There was a wise man on a mountain and two boys down in the valley wanted to confound him. One day they captured a bird and presented it to the wise man and asked him, "What do I have in my hand, oh wise man?" And he, seeing the feathers replied, "Why of course, it's a bird." And now they thought they had him and said, "Is it dead or is it alive," knowing full well that they had it in their control to make the difference. The wise man thought for a long while and he finally responded to the youngsters, "It is as you will it to be."

So as you ponder the questions, "Where is agriculture going?" "How will we make out in the very competitive years ahead?" It say to you, it is as you will it to be! We have to work together as never before. We have to make sure that we stick to science and we stick to reason.

Thank you.

ANNUAL AGRICULTURAL OUTLOOK CONFERENCE

United States Department of Agriculture
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Outlook '90, Session #24

For Release: Thursday, November 30, 1989

CRITICAL ENVIRONMENTAL ISSUES FOR FOOD SAFETY AND QUALITY*

Frank E. Young, M.D., PH.D
Commissioner of Food and Drugs
Rockville, MD

Thank you Assistant Secretary Smith for that very kind introduction. Indeed, I am glad to be a part of this morning's program for three very important reasons:

- o First, it provides me with an opportunity to address an audience which includes persons responsible for growing and buying agriculture commodities.
- o Second, it provides a forum where they can express their concerns regarding the use and availability of pesticide chemicals for crop growth--and I can share the Food and Drug Administration's views on food safety for the 1990's.
- o And third, it allows me a chance to emphasize the essential role that each of the regulatory agencies participating in this exchange plays in assuring that the pesticide chemicals which are applied to the nation's food supply are safe for their intended uses.

Challenges for 1990--The Need for an Inter-Agency Approach

As we focus on the critical issues in food safety and quality for the 1990's, the magnitude of government responsibility to the American public in this area is not lost upon the sister agencies before you. Each agency has an important slice of the regulatory pie which is essential to providing a safe whole. For we are jointly charged with providing a food supply free of harmful chemical residues. Just as important, we have the responsibility of sustaining public confidence that our food supply remains a safe source of nutrition.

This charge presents a host of challenges: Challenges which, I believe, we are meeting responsibly and judiciously. Challenges which, because of our technological age, require us to periodically assess the way we are doing our jobs. Challenges requiring us to initiate changes in some areas of protective regulation, and to simply fortify and strengthen others.

*NOTE: This text is the basis of Commissioner Young's oral remarks. It should be used with the understanding that some material may be added or omitted during presentation.

FDA's Role in Assuring a Safe Food Supply

I do not need to tell those of you present that the American food supply is one of the safest in the world. It offers a quality, abundance, and variety that is unparalleled internationally. This result has not been accomplished by chance.

Rather, it results in part from FDA's diligence and expertise in enforcing the Federal Food, Drug, and Cosmetic Act--known by short hand as simply "the Act."

Under the Act, the FDA's Center for Food Safety and Applied Nutrition (CFSAN) functions to ensure that our foods are pure and wholesome, safe to eat, and produced under sanitary conditions. This responsibility for foods covers essentially all food in interstate commerce except meat and poultry products, which are regulated by USDA.

In meeting this enormous responsibility, FDA has the task of regulating and approving food and color additives that are added to foods to increase their shelf life, along with assuring that other ingredients that may be added to food are generally recognized as safe (GRAS).

In assuring that Americans continue to have access to a safe and wholesome food supply, the FDA carries out the following additional and crucial tasks:

- o We keep food products containing unsafe levels of industrial chemicals, metals, pesticides, mycotoxins and bacteria off of the market and away from the consumer.
- o We prevent the marketing of food adulterated--through improper processing and handling--by filth, decomposition, and foreign objects.
- o We maintain the quality of food products produced in our factories through the inspection of food establishments.
- o We protect consumers from fraud by acting against deceptive packaging and false, inadequate or misleading labeling.
- o We help individual States improve their activities to assure the safety of food service operations, shellfish, and milk.

I might add that while the average consumer may not immediately associate it with food safety, our responsibility for providing nutrient information on foods, guidelines and food labeling standards both for regular and dietary foods are extremely important to people who need this information to make specific food choices.

Indeed, it enables consumers to make nutritional choices when they buy food, particularly for the prevention and dietary management of disease.

I can personally attest to the importance of food labeling to American consumers. This fall, I have chaired food labeling hearings in Chicago and San Antonio, and two additional hearings are scheduled within the next 2 weeks. I have heard from many individuals and groups with a stake in this issue that the time has come for significant changes in the way our food is labeled.

I think you will agree that the FDA has a full agenda in its role as guardian of the Nation's food supply. Our role includes monitoring foods for various food contaminants, including pesticides, which brings us to one of the immediate concerns of today's forum.

This morning, I would like to share with you new concepts and regulatory proposals that FDA believes are critical to addressing the current food safety challenges and assuring the safe use of pesticide chemicals in the next decade--and indeed into the 21st Century. They focus on innovations that will require an even closer working relationship among FDA, the United States Department of Agriculture (USDA), and the Environmental Protection Agency (EPA). We at the FDA are strongly committed to this close working relationship; we welcome it.

Safety of the Food Supply: The Case for Effective Monitoring

Our record of food safety has been achieved through regular monitoring of imported and domestic food commodities, as required by law. Monitoring foods for the presence of unacceptable residues is an important part of our mandate. It is a responsibility that requires our time and attention on a daily basis. And it is undertaken with the health of the American public foremost in our minds.

Although the individual American consumer may be heartened to know that three Federal agencies are cooperating to assure a safe and abundant food supply, the public is basically unconcerned with who has what responsibility. Rather, consumers seek a simple, earnest answer to the fundamental question, "Is this food safe to eat?"

To make certain that we can answer that question in the affirmative, FDA regularly collects samples from individual lots of domestically produced and imported foods to analyze them for pesticide residues. The methods used to detect the presence of residues in foods are usually capable of determining levels well below the established tolerance. Additionally, new methods are being introduced to give on-line quality control, such as probes for microbial contaminants in factories and rapid screening tests for detection of pesticides in the field. Residue tolerances are always set conservatively, resulting in a built-in margin of safety to the consumer.

Thus, when violative residues are found in domestic food samples, the Agency takes appropriate regulatory action. When they are found in import samples, the product is usually detained at the port of entry.

FDA uses this monitoring information, coupled with the data obtained from the various states and international agrochemical data banks, to determine where potential problems might occur and to assist in planning future monitoring of domestic and imported commodities.

Monitoring of Foods in the "Post-Alar" Era

The encouraging news is that our monitoring of the food supply for over 25 years has shown that above-tolerance residues are rarely found. Rather, violations more commonly involve commodities that contain small amounts of pesticides for which no tolerance has been set. The record indicates that over all we have been doing a good job.

This is not the impression one would get from reading about the Alar controversy earlier this year. In the "post-Alar" world, there is room for improvement on the part of all agencies responsible for food safety.

Concerns generated by Alar emphasize that we have to become more effective in evaluating potential pesticide risks, reducing those risks, and informing the American public of our actions---to allay perceptions of unacceptable food quality and increased health risks.

We also must clearly distinguish between the sensitivity of the method used and the presence of a residue. The regulatory limit for action merely is designed to establish when the sample is violative and does not establish that no pesticide is present.

The President's Food Safety Plan

In addressing critical issues of food safety for the 90's, I believe that in addition to our present activities, risk management and risk communications will be at the top of our list. But before we can communicate more effectively, we need to be certain that our own house is in order. That's why the efforts of the Domestic Policy Council are so important. They resulted in the Food Safety Plan which President Bush announced last month.

The plan, which will lead us into the 1990's, focuses on four goals:

- o Protecting the public health by preventing harmful exposure to pesticides in the food supply.
- o Providing simpler and more workable regulations for pesticides used in agriculture, thus helping the farmer know about and follow food safety laws.
- o Strengthening the oversight of pesticides and their use by assuring that unsafe pesticides are not used and by speeding the development of safe alternatives.
- o Building public confidence in the safety of the current and future food supply.

Although the regulatory statutes under which the EPA, USDA, and FDA operate continue to serve as effective barriers for protecting the public from harmful pesticide residues in their foods, the Alar controversy focused on the limitations of those laws. Specifically, it has been pointed out that:

- o Our current pesticide regulatory system takes too long to identify potentially harmful chemicals. And, once problems are identified, it takes too long to remedy them.
- o The cancellation procedure for pesticides is cumbersome and time consuming.
- o There are inconsistencies in the Food, Drug, and Cosmetic Act regarding the setting of tolerances for raw agriculture commodities versus processed foods.
- o We should reassess whether the Delaney Clause provides the most effective means of regulating pesticide-treated foods.

Revisions in FIFRA and the Food, Drug, and Cosmetic Act

The President's initiative seeks to confront these issues and strengthen the existing laws by calling for major revisions to EPA's Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), and the Food, Drug, and Cosmetic Act. In FIFRA, these revisions will streamline EPA's ability to remove potentially hazardous pesticides from the market, and enhance the agency's enforcement program to ensure the safe use of pesticide chemicals.

In the Food, Drug and Cosmetic Act, the initiative would eliminate a long-standing inconsistency in the law governing pesticide residues in foods, and establish a "negligible risk" standard for such residues.

It should be noted that this initiative was developed with the participation of all relevant government agencies as well as the private sector. And, while the President's plan provides seven initiatives involving food safety, there are two particularly important aspects---relating to the broad consumer protection mandate of the FDA---that I want to discuss in more detail with you this morning.

Negligible Risk

Let me begin with the concept of "negligible risk." The President's plan proposes that, for pesticide residues in food posing carcinogenic risks, the Food, Drug and Cosmetic Act should be amended to eliminate the Delaney clause and to add a tolerance threshold at--or below--the level at which the public health is not threatened. The term which sets the standard for this new threshold is "negligible risk."

Fundamentally, the President's plan allows for the establishment of a tolerance level for pesticide residues in food, below which it is deemed that the public health is not threatened--thus permitting a pesticide which satisfies this requirement to remain in use. The tolerance level for various carcinogenic chemical substances would be established based on predicted risk level criteria. Basically, this "negligible risk" level, (or "biological zero risk" as I like to refer to it) replaces the concept of absolute zero risk for cancer contained in the Delaney Clause.

Under the President's proposal, "negligible risk" or biological zero risk would not be defined by law. Rather, the law would set a standard that--under appropriate regulatory risk-assessment procedures--translates into a statistical increased risk of at or below a range of one hundred thousand to one in a million, based on lifetime exposure. These risk estimates represent the "upper bound," or worst case, levels of risk.

As you know, pesticides which concentrate in processed foods are subject to the Delaney clause in the law, while pesticides in raw agricultural commodities are not. This results in inconsistencies in the Food, Drug, and Cosmetic Act. Under one section of the Act, EPA may consider risks and benefits in setting tolerances for pesticides on a raw agriculture commodity, such as tomatoes--and EPA may legally set a tolerance for a known carcinogen.

However, the Delaney clause bars EPA from setting a tolerance on a processed food (like tomato paste), if there is any evidence of cancer risk, no matter how small the risk.

The Case for Elimination of the Delaney Clause

The Delaney clause has been interpreted as requiring absolute safety--or zero risk--because it prohibits the presence of even negligible quantities of a carcinogen. Thirty years ago when the clause was first enacted, such an interpretation was consistent with the science and knowledge of the day. Today it is not.

Current scientific advancements along with increasingly sensitive analytical methodologies have resulted in many more--and increasingly sophisticated--risk assessment techniques. We are now able to detect chemical residues in our foods at parts per trillion or less. These advances have led scientists to conclude that, in some circumstances, some substances shown to be carcinogenic in high-dose animal studies represent no risk to human health when present in much smaller amounts in the food supply under specified conditions of use.

Consequently, in 1987, the National Academy of Sciences (NAS) recommended in its report, "Regulating Pesticides in Foods: The Delaney Paradox," that the "zero-risk" Delaney clause be eliminated because it is scientifically unjustified.

The Academy also noted that the Delaney clause may have the unintended effect of keeping safer pesticides off the market which could replace older, riskier pesticides if use of the newer substances were allowed. The Academy therefore recommended that "negligible risk" be adopted as the uniform standard for tolerances on both raw and processed foods.

Negligible Risk Standard for All Foods

I should note that although the concept of "negligible risk" would be introduced in the context of carcinogenic pesticide residues, the Administration's proposal also noted that the same principles would naturally apply to other areas of food safety where additives are introduced into food.

This is an important point. Not only would it remove an inconsistency in current law, it would bring the regulation of potentially carcinogenic residues in the food supply into line with current scientific thinking and analytical methods.

National Uniformity of Pesticide Tolerances

Let me begin with a discussion of national uniformity of pesticide tolerances. Under the current law, individual states may set tolerances for pesticide residues in food that are lower than those established by EPA. When this has occurred, it has been confusing to consumers and a source of concern to the food industry. Just as important, inconsistent tolerances have raised concern about possible repercussions in the international trade community for raw and processed food products.

The President's proposal--and all of the Agencies here today support it--provides for national uniformity, prospectively, for chemical tolerances. Under the proposal, once a pesticide has been re-registered pursuant to the 1988 revisions of FIFRA--and an appropriate tolerance has been set as part of that process--the national uniformity provision takes effect. In this way, new tolerances set under modern state-of-the art science, would have nationwide applicability.

Any state or local standards applicable to the same chemical substances must then be identical to federal standards. A state may, however, enforce a more stringent standard if it has met established EPA criteria and obtained a waiver from EPA. The criteria will allow waivers only when special local circumstances warrant.

Uniform national pesticide tolerances is clearly an issue whose time has come. When one considers that the world is becoming smaller, that the nation's food supply is an international food supply, and that the European Community intends to be fully integrated by the year 1992, we need to be of one accord with tolerances for residues in foods.

Communicating "Zero-Risk" versus "Negligible Risk" or Biological Zero

The next crucial step is to effectively communicate to American consumers the merits of what we are doing. If we are to succeed, and we must, it will take the collective efforts of all here today. Our primary goal will be to clearly explain that going from a "zero risk" to a "negligible risk" does not entail an increased health risk on the part of the public.

Conceptually, "zero risk" versus "negligible risk" is a change. But in practice, in real life terms, it is not. What has changed more than anything else is our ability to measure trace amounts of any substance, including carcinogens. The concept of "zero risk" does not mean today what it did in 1958, when the first Delaney Clause became law. For any given food product, there was a level of risk back then, and it was, like the comparable risk today, a "negligible risk."

It only appeared to be a zero risk, because science lacked the precise and sophisticated analytical tools to detect and measure the risk.

This evolutionary change in the concept of risk embodied in the Federal Food, Drug, and Cosmetic Act is essential. If the Act is not changed, we will be at a terrible impasse as analytical methods improve even further.

A third point is a corollary to the second. It requires that a single, scientifically-based method of risk assessment be developed through consensus--and that this method is applied by the EPA, the USDA, the FDA, state officials, and private sector groups. The trust of the public cannot be maintained or strengthened if we do not use the most up-to-date methods to define and quantify risks.

Honoring the Public Trust and Communicating the Facts

The current dilemma is that just as the government is endorsing a standard of "negligible risk," many consumers are calling for a "risk free" society. And while a "risk-free" society does not exist--it cannot exist--the standard of "negligible risk" provides the best possible level of consumer protection. I think the majority of the American public will also agree, if we take the time to communicate and to sensitively listen to concerns. I believe that the Good Lord gave us two ears and one mouth so we can listen twice as much as we talk--and not only to listen but to hear. This dialogue and trust between the public and public servants must be strengthened.

There is no question that we will continue to improve and increase our monitoring of pesticide residues in the food we consume. Strategies such as integrated pest management and decreased reliance on pesticides are promising, and we wholeheartedly support them.

Concluding Observations

I have four concluding observations.

The first is based on our assessment of risk in the food supply. Although we can with great confidence assure the safety of the food supply, we cannot guarantee zero risk. This means that we--and here I mean the collective "we" that includes growers, producers, processors, scientists, regulators, and consumers--will have to strive continually to improve our ability to communicate the nature of risk more effectively.

Second, we must develop formal courses about risk assessment, risk avoidance, and public health in our educational system. Despite the relatively higher risk of drug abuse in our society, I have participated in far more hearings on food safety than substance abuse. We must be able to distinguish between real and imagined risks and determine what risks are worthy of our increased efforts to reduce them.

Third, we must do all we can to avoid circumstances that would force regulatory decisions to be made on the basis of emotion rather than science, particularly at a time of crisis.

Finally, we should always tell the truth. This means reporting the bad along with the good. It means treating all groups with a stake in food safety issues like the intelligent adults that they are.

For regulatory agencies like the FDA, it means earning the trust that society places in us: consumers rely on us to inform them about the safety of the food that sustains and nourishes them every day. This is one of the tasks that government can do best, and it is a task that only government is authorized to carry out. But to do so, we must have both integrity and public trust.

Thank you for your attention. If there are questions, I would be pleased to answer them.

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CRITICAL ENVIRONMENTAL ISSUES FOR AGRICULTURE*

F. Henry Habicht II
Deputy Administrator
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I hope the times are changing with regard to the role of an agency like EPA working with and supporting the Department of Agriculture, and all of agriculture, by helping to initiate an agricultural policy that includes the concept of sustainable development. I think there is a change. Frank Young described development of the President's food safety legislation in which the agencies could proceed in lockstep with our recommendations. It is historic legislation. And, it is a historic process by which that legislation was developed. It is not simply because USDA has "seen the light" on environment. It is as much the case that EPA has seen the forest with regard to the role of environmental protection and how a sustainable approach to environmental protection can actually promote a sound economy. It also reflects some recognition by the agricultural community of the importance of environmental issues and how we can integrate the environment productively and constructively into the way we live and do business. That is the forest that we at EPA are seeing.

I want to spend a few minutes on how EPA is approaching environmental protection generally and how we see our working with Secretary Yeutter and his visionary team in dealing with the realities that we all face over the next couple of decades. I am not going to talk about EPA's agenda for agriculture as EPA's agenda, because it really is an Administration agenda.

Bill Reilly and I both grew up in the Midwest. We were not in farming ourselves but we grew up around farms in Illinois and Indiana and Michigan. My wife's whole family still lives in Kansas and virtually all of my immediate family went to Purdue. I had the bad judgment not to keep up that string. But the point is that we individually, and I think the Agency as a whole, approach agricultural issues from the perspective that is very much in line with what Jack Parnell talked about at the beginning of this session. Agriculture not only is a great success story; but we also believe that from the standpoint of protecting the human environment, the importance of a safe and adequate food supply is central. We also believe that the American farmer is central to America's history, to our culture and to our economy. We think it is important that we support this continued central role for agriculture in whatever policies we develop jointly with the other agencies with regard to a safe and adequate food supply and a production process that is environmentally sustainable.

*Based on a transcript.

It is symbolic that this surge in agricultural productivity over the last 30 years has often been referred to as the "Green Revolution." Green is a term that is often used to describe environmentalists and I don't think it is ironic at all. I think that farmers are the first environmentalists. The concern that the farmer has is fundamental both to the relationship that the farmer has to the land and to the water resources of the country and the world, and also to the self-interest in maintaining productivity over time. We have to preserve and conserve land and water resources. This is fundamental to the farmer's character. So there is not an attitude issue at all. It is an information issue that we intend to work closely with you all to deal with.

Bill and I are close to this issue. We care deeply about it. We are not experts on farming and that is why we have on our personal staff Jim Mosley, whom some of you may know. He is a very successful producer from Lafayette, Indiana who advises us on the agricultural perspective in all of our issues.

Let me give a sense for our perspective on the environmental agenda coming up in the years ahead. The watchword that we're using and that the President has used is the concept of sustainable development. We think it represents a sea change in the way society approaches environmental protection. For the last 20 years the environmental protection movement has been a corrective, ameliorative movement. We have identified problems and then we have scrambled to clean them up or correct them after the fact. In the future, the organizing principle for environmental protection has to be pollution prevention or the concept of sustainable development. This means that if you integrate environmental concerns into the beginning of the planning and investment process, you not only have a more safe and sound environment, but you have a more productive and efficient economy.

There are some obvious examples in the production sector. I recently read a statistic from Japan that over the decade from the mid-70's to the mid-80's they measured what it took to produce a single constant unit of production. Over that time the raw material and the energy input into that single constant unit of production decreased by over 40 percent--the same production but 40 percent less energy and raw material use. American industry is doing the same thing. Many basic principles of sustainable development show that what is good for the environment is good for production.

Waste is the same kind of issue. Obviously, when we produce waste, we have to spend a lot of money trying to deal with it. Waste is also an indication of inefficiency. So in the manufacturing process we have seen the cost of an after-the-fact approach to pollution. We are going to be spending literally hundreds of billions of dollars simply to clean up past hazardous waste problems. In agriculture the same kinds of lessons are clear from the standpoint of the problems that result from erosion, the fact that the Ogallala aquifer, which 40 years ago had enough water to fill Lake Huron, is now being depleted to the point where it is causing very significant concern. And fears about chemical use has at times shaken public confidence in the food supply. I think we are all in concurrence here that the food supply in the United States is safe, but if there is a public confidence problem, that is obviously not good for business and the well-being of the agricultural community either.

I didn't come here to provide a litany of the issues such as non-point source run-off concerns, and wetlands or ground water contamination. Those are the issues on the agenda. We want to talk about the ways we are approaching them. In our management approach at EPA we have three fundamental tenets of our management plan. The first is to develop a strategic plan for EPA for the next 5 years. Over the last 20 years we too often have responded to crisis with regulations. We don't think that is the way to approach sustainable development. So we want to be sure the Agency is looking at the forest, that we are looking down the road, that we are prioritizing environmental risks, we are talking more openly with the public about it, and developing strategies that will reduce those risks in a sound and open way.

The second element relates to developing better information. We must spend more time and effort on research and developing data about environmental trends and conditions so that we are less subject to crisis. The crises come when some snippets of evidence emerge about a problem and we don't have enough research and information to be able to put it into context, and therefore we are often forced to assume the worst case. Better information developed jointly by all the agencies that do research is going to be critical to our taking a strategic approach to the environment. Also, it is necessary to disseminate that information so everybody has what they need to be able to develop the best strategies for protecting the environment.

And the third element is what we call building new structures of cooperation. Bill Reilly and I would be the first to admit that EPA, especially nowadays, can't protect the environment by ourselves, if we ever thought we could. EPA can only deal with a small part of the issue. We can provide some technical assistance, some research, some information, some regulatory guidance, but environmental protection is a society-wide enterprise. A big part of EPA's agenda will be to develop structures of cooperation among Federal agencies, with the States, and with the private sector so that we can be effective.

Strategic planning is in process now and in about 3 months we will be developing and sharing draft strategic plans that start to establish risk priorities. We will start to talk to the Congress and the public about those priorities, and certainly agricultural issues will be on that list. But the strategies that we develop to deal with those issues are going to be developed cooperatively. I think some recent examples, such as the food safety bill, are signs that that cooperation is already taking place.

I won't rehearse food safety legislation. We think it is extremely important, particularly because it emerged from this cooperative effort. It is designed to reassure the public, to make sure that we can maintain public confidence, and that there are no unnecessary crises. The public will know that we have the tools we need to deal with information that causes concern because after all, we all work for the public. We have to be sure they are informed and they have to know we have the tools to deal with problems so that when we say that the food supply is safe, they will believe us and rest easy. And when we say there is a problem there will be general agreement

that there is a problem to be dealt with. That's what we are addressing in the food safety bill.

A second key element of this cooperation that is going to be terribly important for the future of agriculture and the environment is the 1990 Farm Bill. I am sure there has been a lot of discussion about that and I wouldn't presume to try to add much more. Obviously things are still fluid. EPA has been working closely, under the leadership of Secretary Yeutter and his team, which has a very visionary kind of view, in incorporating a sustainable development approach to the Farm Bill.

Another very important element of what is evolving in the Farm Bill is, again, promotion of research and making sure that we have research that not only incorporates environmental issues into researching alternatives, such as LISA and alternative agriculture, evaluates the potential success of various alternatives, before farmers are asked to plunge into a new area or a new approach to agriculture. We must have information about what are the most promising avenues so that we don't have any kind of significant hiatus in productivity as we move into new approaches.

A third element of cooperation regards ground water strategy. This is an area that affects agricultural and environmental issues across the board. Every program at EPA involves ground water in some way or another. It is important for us to work with other agencies, particularly the agricultural community, to develop a ground water strategy that above all gives appropriate deference to State and local leadership in managing ground water resources but also makes sure that, again, the public is reassured and we are all reassured that this renewable resource is in a position to be protected and to be sustained over long periods of time. That kind of strategy is underway and we are working very closely with the Department of Agriculture in developing it.

As much as possible, we want to provide the information and the guidance but leave as much of the choice making to the industry and to individuals. That's why in our pollution prevention approach we want to develop information that shows that, for example, in agriculture low input should not at all mean low output. In fact, we need to do everything we can to make sure that low input approaches that are taken are maximum output and to promote market incentives. We want to hear from the agricultural community, and work closely with USDA, to determine what kinds of incentives make the most sense in terms of maintaining and improving the productivity of American agriculture.

So a key element of the future agenda that I will just close with here involves research, education and using the land-grant institutions around the country and the extension network to communicate and to develop better information in several key areas. One, of course, is food safety, to make sure that at all levels of Government and in academia, we have as much common ground with regard to the assessment of risk, and that we have as thorough a description of the risk assessment process as we possibly can so that we all do have credibility with the public and we avoid food scares. And when we

make regulatory decisions, we describe their significance to minimize any unnecessary food scares or hysteria. In technology, EPA intends to support the development of new technologies and approaches to agriculture in areas like innovative tillage practices, targeting the use of chemicals in a way that minimizes their unnecessary spread and dispersion, different formulations of chemicals that are used, and, of course, biotechnology, which we also believe is a very promising avenue for the future. Ground water is another important area for us to pursue. Finally, economics is an area in which across the board in the environment the importance of accounting properly for the cost of environmental controls and protection is going to be critical to making sustainable development work. So we very much support the networks of the U.S. Department of Agriculture, land-grant universities, and others, to develop information, to promote research that has scientific credibility and to get the word out to the public to inspire their confidence.

President Bush recently described in a speech the way he looks at the environment, and the way we all need to. He said, "through millions of individual decisions, through millions of simple everyday choices, we are all determining the fate of the planet." He has, as we do at EPA, an unfailing confidence in the spirit and the abilities of the American people and the people around the world, but particularly the American people and particularly the American farmer, to identify problems and deal with them.

We have it in our hands, as Jack Parnell says, to come up with the answers. The first order of business is for the Government to get its act together, for all the agencies that have a role in this, public and also non-profit agencies, to communicate and have their act together and be speaking as much in common as possible. We have started that. But we also need to involve everybody in the private sector. So I hope that this conference and our participation here is just the beginning of a process of mutual discussion. You'll get used to seeing EPA at conferences like this. We are pledged to listen to you and work closely with you.

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ENVIRONMENTAL CONCERNS, FOOD SAFETY AND AGRICULTURE* IN THE 1990'S: QUESTIONS*

Moderator: USDA Assistant Secretary Jo Ann Smith

Panelists: FDA Commissioner Frank E. Young
EPA Deputy Administrator F. Henry Habicht II

SECRETARY SMITH: I would like to recap a few things that we have heard that are so very important that we take away from this conference. And particularly as you have had the opportunity to hear from three agencies that in the past, to be very frank with you, have not always gotten the headlines for being cooperative. You heard the term cooperation from the Secretary, from Dr. Young, from Mr. Habicht, and the willingness "to work together in a working relationship." All of them expressed very, very strong commitment that we have the safest food supply in the world, and this commitment will continue. Another area of discussion in each presentation was communications. We must be better informed. We must inform. Other areas of very key concern in each of their comments were science, research and the fact that science, not emotion, should drive policy.

These gentlemen certainly have brought to us very strong messages. Now for questions.

QUESTION: Dr. Young mentioned harmonization of regulation between States. California law is typically more stringent than most other States. How do you envision regulations which California can buy into, and will the Federal Government move more toward the California type regulation?

COMMISSIONER YOUNG: We have already had some discussions, under the leadership of Senator Hatch, with a number of people in California; and I have had the opportunity of meeting when I have been out testifying on some of the issues there. The key point is the need to develop an honest risk assessment that is scientifically sound, appropriately conservative, and then under those circumstances, get the participation of people in all States. Then we could have an appeal process whereby a State can bring particular concerns, if there are some, and they can be evaluated and, where necessary, exemptions could be put into place. But we are living in a shrinking world and if we don't understand that we must have uniform, scientifically sound, carefully derived risk assessments, I think we will go astray.

ADMINISTRATOR HABICHT: My only additional comment is that the process we envision under the President's food safety legislation is an open, public-informed process. No decisions are going to be made without all the information being laid out on the table. If a particular State has

information that indicates that we have underestimated risks and it is credible scientific evidence, the regulations will move to the level of the credible scientific evidence in a public process that everyone will have a chance to weigh and take part in. I think those kinds of principles are important as well.

QUESTION: How do we counter the activities of groups who use scare tactics to effect governmental policy and emotionalism?

ADMINISTRATOR HABICHT: The concern about the use of scare tactics is one that we all share. Unfortunately, it does happen. I think most environmental organizations want to work based on sound science. There will be professional disagreements but they basically believe, as we all do, in sound and credible science. I think scare tactics will be with us until we develop this research, this sort of integrated network where all the agencies are doing research together and are communicating and being consistent in the way they address these issues. As long as there is inconsistency and disagreement and gaps in information, there will be an opportunity for people to talk about the worst case. The way we avoid having to deal with the worst case assumptions every time we make a decision is to have a foundation of good research and scientific information and a network of public and private scientists that work on these issues and communicate regularly. That will take time.

In the meantime, it is important for the Government to put everything out in the open. As long as the public doesn't feel as though we are holding anything back when we talk about these issues and when we are frankly uncertain, we talk candidly about that uncertainty, the public will gradually develop a degree of confidence that the Government is being open. I think the hysteria is aroused when there is a suspicion that the Government hasn't given all the facts to the public.

COMMISSIONER YOUNG: I would concur, and I would add just one personal experience. I had the opportunity, because my field is biotechnology, (genetic engineering) to take part in the public discussions of NIH guidelines, 15 years ago. I think you hit the nail on the head when you said, "make sure there are open full processes." We do not have a problem with biotechnology in the pharmaceutical industry today primarily because there was a lot of opportunity for public interaction with State and local Governments and with scientists. Just recently we reviewed the new vitally important drugs that were approved in 1986, 1987 and 1988. Thirteen breakthrough therapies were approved, biological drugs such as TPA that dissolve blood clots, that prevent heart destruction. Seven of the 13 resulted from biotechnology. You do not see the concerns that were there in 1974, 1975, 1976, 1977, 1978 and 1979 because I believe we had an honest, intense, public discussion. We need to have the same thing in food safety and risk assessment.

QUESTION: A fundamental point in public understanding of food safety is the effectiveness of FDA, USDA and EPA programs. The agencies' credibility--and that is plural--is eroding due to the lack of resources for enforcement. Do you agree with this and if you do or if you don't, are there plans to address the issue?

COMMISSIONER YOUNG: We do a substantial amount of enforcement. One of the problems that we as people have to address (and I think it is much more than the political party that was involved because the issue of reduction of FDA resources began under the Carter years and it continued in the Reagan years) is the great concern about how much money we are paying as taxpayers. Let's be fair about it. Your entire protection over \$570 billion worth of industry for the Food and Drug Administration is \$2 per man, woman and child. Now that, I would submit, is a bargain. And the public confidence in the FDA is second only to the Park Service in a wide variety of surveys.

One of the concerns that I have had as Commissioner is increasing the enforcement program. But we have to determine what areas will be high priority in our enforcement program. You and I have an upward-bound risk of a certain number of us contracting an HIV infection following a blood transfusion. Which would you like inspected with limited resources, your blood supply or your fish? You have to make a choice. You cook your fish, you don't cook the unit of blood that you receive. You can kill salmonella in chicken by cooking it. You don't cook your medicines. You don't cook your pacemaker when you get it implanted. Regretfully, we have seen in the last decade a rise in single issue focus groups. And it is true that when we make priorities an issue can be raised by an individual who says, "but you are not doing this." One of my greatest laments as a public servant is that Washington is a series of trees and no forest. We do not make priorities and focus on those issues that are important. I think that is the nub and I believe we need to have consensus on what should be done, particularly as a Nation, since our desires have outstripped our resources.

ADMINISTRATOR HABICHT: That answer was profound. I would just add a couple of comments from EPA's perspective both on enforcement and then on the credibility question generally and the priority setting process. I think one of the problems EPA has had in the past that we have identified is that we haven't talked enough about what we are doing and how we are doing and what our plans are. We end up--again, using the tree analogy--being hauled up to Congress about some particular decision or we end up with our people being preoccupied with deadlines and other statutory requirements. We don't step back and talk to the public about here is what our agenda is, here is what we are looking at, tell us what you think, and so forth. That is what this strategic planning process that I mentioned earlier is all about--to lay out all the demands under the statutes, other issues we think are important, and how we intend to address them so everybody knows where we are coming from.

With regard to enforcement, I have spent most of my career in the environmental field in enforcement. I ran the division at the Justice Department that was in charge of enforcement. I have watched over the last 5 years the resources at EPA for enforcement growing steadily. The number of cases brought has grown steadily. I had a hearing before Senators Lieberman and Reid about our enforcement strategy just 2 weeks ago. We are developing over the next 6 months a strategy for enforcement for the 1990's. We are issuing a report about enforcement in 1989 in the next month. Enforcement is one part of what we do, but we recognize it is a bellwether to the public of commitment and we're acting accordingly.

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